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# THE PHARMACIST
AND
# Chemical Record.

PUBLISHED BY THE

CHICAGO COLLEGE OF PHARMACY.

VOL. IV.

N. GRAY BARTLETT, EDITOR.
ALBERT E. EBERT, ASSOCIATE EDITOR.

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PUBLISHING COMMITTEE.

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CHICAGO:
PRINTED BY J. J. SPALDING & CO.
1871.

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THE PHARMACIST

AND

CHEMICAL RECORD.

VOL. IV. CHICAGO, JANUARY, 1871. No. 1.

# NOTES ON AROMATIC SULPHURIC ACID AND CONFECTION OF SENNA.

BY JOHN W. EHRMAN.

Every dispenser is acquainted with the objections which may be brought up to the present officinal formula for aromatic sulphuric acid. As the committee on revision of the pharmacopœia is now in session, it is to be hoped that the formula under consideration may be modified, and with it several others of a like nature.

The aromatic sulphuric acid is used most extensively as a solvent for sulphate of quinia, in prescription, usually with watery or syrupy vehicles. When prescribed alone for the medicinal effects of the acid, it is not unfrequently diluted in order to modify its taste, and, avoiding the use of drops, to render its administration more convenient.

Now, when the elixir of vitriol is associated in this manner with watery fluids, the coloring and extractive matter becoming insoluble in the menstruum, precipitates, and the result is a muddy mixture instead of the clear solution we should otherwise obtain. But the elixir of vitriol, even undiluted, is constantly undergoing change, with the continual deposition of a bulky precipitate, so that it can be dispensed in a bright condition only by frequent filtration. This, of course, is exceedingly annoying, and it is a reproach to the progress of pharmacy that the formula has been so long retained without material change. The old method of preparing it by exhausting the powders with the mixed alcohol and acid is preferable to that now employed, as it gives a preparation less prone to deposit by standing. The other objections, however, apply to this with equal force; for the ingredients afford to the menstruum principles, which must of necessity separate upon dilution.

In revising this formula we should keep in view the fact that the resulting preparation should be miscible with water without precipitation, hence aromatics of an oleoresinous nature cannot be used.

The following formula we have used for some time, and have found entirely satisfactory:

Take of Sulphuric Acid, three troy ounces;
Fluid Extract of Orange Peel, one fluid ounce;
Red Rose Leaves, two drachms;
Boiling Water, one fluid ounce;
Alcohol, a sufficient quantity.

Add the acid gradually to half a pint of alcohol, and pour the boiling water upon the rose leaves; when both liquids have become cool, unite them, add the fluid extract and sufficient alcohol to make up the measure of eighteen fluid ounces. Mix thoroughly and filter.

Elixir of vitriol, thus prepared, has a pleasant aromatic odor and flavor, and the beautiful red color of the rose leaves, heightened by the presence of the acid. It is miscible with water without turbidity, and a specimen, after long keeping, has deposited but a trace of sediment.

### CONFECTION OF SENNA.

This preparation, when properly made, is an excellent laxative—for habitual constipation superior, perhaps, to any other remedy. It is not in such general use among physicians or the public as it is entitled to, and this probably arises from the fact that much of the confection of senna of the market has little or no resemblance to the officinal article, and is comparatively worthless. Pharmaceutically considered, the officinal process yields a result which is unobjectionable, save in two particulars; first, the presence of the powders of senna and coriander (and especially of the latter, which is most difficult to prepare), imparts a degree of "grittiness" which is disagreeable to the patient, giving the impression that "dirt" is present; secondly, the consistence of the confection when evaporated to the specified weight, varies as prepared from different specimens of drugs, and is sometimes too thin, when the mass is apt to go into fermentation. Fortunately, these defects may be easily remedied. In our opinion, the purging cassia, considering that it is so difficult to obtain, might well be omitted and substituted by an additional quantity of senna, particularly as there can be no advantage in multiplying the number of substances having similar therapeutical properties, in this or other preparations. We have used the modified formula given below (the coriander also being omitted and substituted by ginger), which is free from the objections we have mentioned. It is much more agreeable to take than the officinal confection, and is equally efficient:

| | | | |
|---|---|---|---|
| Take of | Tamarinds, - - - - | 20 | parts, |
| | Figs, bruised, - - - | 20 | " |
| | Prunes, sliced, - - - | 15 | " |
| | Fluid Extract of Senna, | 10 | " |
| | " " Ginger | 1 | " |
| | Sugar, - - - - - | 30 | " |
| | Water, a sufficient quantity. | | |

Digest in a close vessel, by means of a water bath, the tamarinds, figs and prunes in 10 parts of water, for three hours; separate the coarser portions with the hands, and press the pulpy mass by rubbing, first through a coarse seive, and then through a very fine one. Mix the residue with 4 parts of water, and, having digested the mixture for a short time, treat it as before, and add the product to the pulpy liquid first obtained, evaporate to a syrupy consistence over a water bath, add the sugar and continue the heat for 20 minutes, or until the sugar is dissolved; then remove from the bath, add the fluid extracts of senna and ginger, and mix thoroughly.

CHICAGO, December, 1870.

---

# ON THE THEORY OF ETHERIFICATION BY HYDROCHLORIC ACID.

BY M. E. FRIEDEL.

[Translated by the Editor from the Journal de Pharmacie et de Chimie.]

The admirable experiments of M. Williamson have so completely elucidated the long controverted theory of the transformation of alcohol into oxide of ethyl, that the subsequent researches of M. Alvaro Reynoso, and of MM. Friedel and Crafts, have added only certain points of detail, and given to the results an interpretation in conformity with that of the English chemists.

The theory of the formation of compound ethers has been studied with care by MM. Berthelot and Pean of Saint Gilles, in reference to the direct action of acids upon alcohols, and the laws which these learned chemists have deduced from their investigations have still greater importance, since they seem to apply to all cases of slow reactions, which are limited in effect by accompanying reactions of an inverse character.

But there is one process for the preparation of these compound ethers, often used in practice, which has not been explained; it is that which consists in passing gasseous hydrochloric acid through a mixture of alcohol and the acid with which its combination is desired. In this case also there should be seen a well defined chemical reaction between the ether producing substances, and I was led to inquire at once, if the formation of acetic ether, for example, could be attributed to the action of the hydrochloric acid upon the alcohol with the production of chloride of ethyl and water, and an immediate reaction of the chloride of ethyl upon the acetic acid, resulting in the formation of acetate of ethyl.

It did not appear to me that we could find here an explanation of etherification. The chloride of ethyl is a body relatively stable—in fact, more so than the acetic ether; and at the temperature at which the operation is generally performed, it is difficult to admit that the chloride reacts upon the acetic acid with regeneration of hydrochloric acid; at least, if the last reaction takes place, it must be confined to a very small portion of the mixture, for it is known that hydrochloric acid can decompose acetic ether, yielding acetic acid and chloride of ethyl. Besides, I assured myself by the direct experiment of heating in a closed vessel, to 100°, for about ten hours, a mixture of chloride of ethyl and crystallizable acetic acid, that no sensible reaction occurs. The vapors which were disengaged at the moment of opening the tube did not occasion the slightest turbidity in a solution of nitrate of silver, and fractional distillation of the fluid did not afford a single product having a boiling point approaching that of acetate of ethyl.

The action of the hydrochloric acid being incapable of explanation by the former theory, I was led to admit that the hydrochloric acid could transform the organic acid in a chloride. If the organic acid be alone in the presence of the hydrochloric acid, there must be produced simultaneously with the chloride of the acid radical a corresponding quantity of water; hence, there must of necessity be a reverse action of water on the chloride, with regeneration of both the organic and of the hydrochloric acids; we can then comprehend how the production of a chloride of an acid radical, by the simple reaction of hydrochloric acid upon an organic acid, has not been observed. In the contrary case, when the chloride of the organic acid, at the moment of its birth, encounters alcohol, it reacts upon the latter, producing an ether and hydrochloric acid, and the quantity of water due to the transformation of the acid into a chloride, is incapable of decomposing the ether. According to what has been shown by MM. Berthelot and Pean of Saint Gilles, a part, at least, of the ether can resist the action of the water.

These two phases of etherification can be expressed, taking acetic acid, for example, by the following equations : ($C=12$ $O=16$.)

$$C_2H_3O, HO + HCl = C_2H_3O, Cl + H_2O$$

$$C_2H_3O, Cl + C_2H_5, OH = C_2H_3O_2, C_2H_5 + H\,Cl.$$

In this case we should be able to seize the water at the moment of its formation, and isolate the chloride of the acid radical. This I endeavored to do by the aid of anhydrous phosphoric acid, and with complete success. When benzoic acid is mixed with an excess of anhydrous phosphoric acid, and dry hydrochloric acid is passed into the retort enclosing the mixture, the temperature of the latter being meanwhile maintained at the boiling point of chloride of benzoyl, or a little below there appears in the receiver a liquid distilling at 198°, which, after redistillation, is pure chloride of benzoyl. It has the well known odor of chloride of benzoyl; it sinks in water, and is decomposed after a time into benzoic and hydrochloric acids. The quantity obtained has been 15 grammes of the chloride from 20 grammes of benzoic acid employed; the reaction indicated is sufficiently convenient and productive to serve in the preparation of the chloride of benzoyl, though in this case there would be reason to fear the presence of the oxychloride of phosphorus, as it is very difficult, as is well known, to separate completely the chlorides of the acid radicals. In replacing benzoic by acetic acid, analagous results were obtained, only the quantity of the chloride produced was less abundant.

When a mixture of anhydrous acetic and phosphoric acids is made, it is necessary to use care, adding the latter, little by little, to the acetic acid, which must be kept well cooled; if ever so little of the mixture be made too rapidly it browns, and is transformed into a tarry mass. By operating with care we can, on the contrary, obtain a colorless mixture, which, when traversed by a current of hydrochloric acid at a temperature of 60° to 80°, gives a very volatile liquid, which may be condensed in a U tube, cooled by a freezing mixture. The liquid emits at first an abundance of hydrochloric acid, and may be redistilled, almost entirely at a temperature between 50° and 55°. Treated with water it comports itself like the chloride of acetyl, the odor of which it also has. I did not succeed in separating the chloride of acetyl by simply passing the hydrochloric acid through the acetic acid at 80° to 100°. It is probable that the small quantity of chloride which may form at the commencement of the reaction is absorbed by the hydrochloric which is disengaged.*

The preceding experiments appear to me to verify the theory given above, of etherification by hydrochloric acid. I do not think it can be admitted that the phosphoric acid acts otherwise than by abstracting water. It is known that anhydrous phosphoric acid is not capable of transforming benzoic and acetic acids into their anhydrides, that at the utmost it can only form with their conjugate acids. The latter are not susceptible of decomposition by the action of hydrochloric acid into the chlorides of the acid radicals, as is the case with the anhydrides, as shown by M. Gal.

I have concluded that hydrochloric acid reacts upon organic acids, with the formation of water and chlorides of the acid radicals; but that this reaction is limited in effect by the presence of the very products which are formed, as has been well shown in the last examples. By removing gradually one body resulting from the reaction, the formation of the other could be rendered complete, for this would undoubtedly take place if the phosphoric acid, after a certain time, did not itself react upon a part of the acid, causing, at least by urging it still further, the rearrangement of the decomposible products in a combination more stable, as could occur by the transformation of the chlorides of the acid radicals into ethers.

---

## OINTMENT OF MERCURIC NITRATE.

*Mr. Editors:*

Should you deem the following of any importance to the readers of our home journal, you may insert it in your pages:

### OINTMENT OF MERCURIC NITRATE.

Being in need of some of this ointment, I prepared a quantity according to Mr. Rother's formula, which appeared in the PHARMACIST for July last; but when effervescence ceased, and the liquid only boiled, even under increased heat (as the formula reads), it turned rapidly to a dark brown color, and after stiffening, and the addition of the mercurial solution, the ointment appeared of the color of raw umber. On making a second trial the effervescence was allowed to go on very slowly, confining it to the center of the liquid, till it ceased. It had then a reddish brown appearance—lemon yellow at the edge. At this stage it was kept at a temperature between 185° and 190° F., as indicated by a thermometer, and was briskly stirred with a wooden spatula, to insure the complete liberation of nitrous acid fumes, and the reaction of the acid on the lard. The result was a most excellent ointment, both in color and consistence.

---

* M. Beketoff has met, in a different way, with a reaction having some analogy with the preceding; he obtained the chloride of benzoyl by heating a mixture of benzoic acid, common salt, and bisulphate of potassa.—*Bulletin de la Societe Chimique, Vol. 1st, p.* 10: 1859.

The patient and scientific research of Mr. Rother upon the reactions occurring in the preparation of this ointment, and the practical results he deduced from them entitle him to the thanks of the pharmaceutical profession at large; for I think that the reduction to a definite result of that which was formerly left to mortifying failures or mere chance, is of importance to every practical member of our profession.

CHAS. FREDIGKE.

CHICAGO, Dec. 14, 1870.

---

# COLLATED PRACTICAL RECEIPTS.

BY ALBERT E. EBERT.

## CULINARY ESSENCES.

*Flavor of Almond.*

Take of Oil of bitter almonds, one fluid drachm.
Alcohol, 95%, ten fluid ounces.
Water, six fluid ounces.

Dissolve the oil in the alcohol and add the water, and filter.

This flavor should not be sold without a caution as to its poisonous nature, and directions as to the quantity to be used.

*Flavor of Caraway.*

Take of Caraway seed, bruised, one troy ounce.
Oil of caraway seed, two fluid drachms.
Diluted Alcohol, sixteen fluid ounces.

Digest for 8 or 10 days, and filter.

*Flavor of Celery.*

Take of Celery seed, bruised, four troy ounces.
Diluted alcohol, sixteen fluid ounces.

Digest for 8 or 10 days, and filter.

*Flavor of Cinnamon.*

Take of Ceylon cinnamon, bruised, two troy ounces.
Oil of cinnamon, half a fluid drachm.
Diluted alcohol, sixteen fluid ounces.

Digest for 14 days, and filter.

*Flavor of Cloves.*

Take of Cloves, bruised, one troy ounce.
Oil of cloves, two fluid drachms.
Diluted alcohol, sixteen fluid ounces.

Digest for 8 or 10 days, and filter.

*Flavor of Ginger.*

Take of Ginger root, bruised, two troy ounces.
Wild ginger (asarum), bruised, one drachm.
Lemon peel, bruised, one troy ounce.
Diluted alcohol, sixteen fluid ounces.

Macerate for 14 days, and filter.

*Flavor of Lemon.*

Take of Lemon peel (fresh), cut thin, two troy ounces.
Oil of lemon (fresh), one fluid ounce.
Alcohol, 95%, twelve fluid ounces.
Water, four fluid ounces.

Digest for 8 or 10 days, and filter.

*Flavor of Nutmegs.*

Take of Nutmegs (grated), one troy ounce.
Oil of nutmegs, two fluid drachms.
Diluted alcohol, sixteen fluid ounces.

Digest for 8 to 10 days, and filter.

*Flavor of Orange.*

Take of Orange peel (fresh), cut thin, two troy ounces.
Oil of orange (fresh), half a fluid ounce.
Alcohol, 95%, twelve fluid ounces.
Water, four fluid ounces.

Digest for 8 to 10 days, and filter.

*Flavor of Rose.*

Take of Red rose leaves, in coarse powder, half a troy ounce.
Oil of rose, pure, five drops.
Alcohol, 95%, six fluid ounces.
Water, ten fluid ounces.

Dissolve the oil in the alcohol, mix with the water and macerate the rose leaves for 8 to 10 days in the menstruum, and filter.

*Flavor of Tonqua Bean.*

Take of Tonqua bean, bruised, four troy ounces.
Orris root, in powder, half a troy ovnce.
Diluted alcohol, sixteen fluid ounces.

Digest for 14 days, and filter.

*Flavor of Vanilla.*

Take of Vanilla bean, cut very small, two troy ounces.
Diluted alcohol, sixteen fluid ounces.

Digest for 3 to 4 weeks, and filter.

Flavors of banana, pineapple, raspberry and strawberry, termed fruit essences, are alcoholic solutions of the amyl and ethyl ether series.

*Flavor of Pineapple.*

Take of Essence of Pineapple (artificial), six fluid drachms.
Diluted Alcohol, fourteen fluid ounces.
Simple Syrup, one fluid ounce.
Tincture of Cinnamon, two fluid drachms.
Mix.

*Flavor of Raspberry.*

Take of Essence of Raspberry (artificial), one fluid ounce.
Diluted Alcohol, twelve fluid ounces.
Syrup of Raspberry (fruit), two fluid ounces.
Tincture of Orris Root (four ounces to the pint),
Tincture of Cochineal, of each half a fluid ounce.
Mix.

*Flavor of Strawberry.*

Take of Essence of Strawberry (artificial), one fluid ounce.
Diluted Alcohol, thirteen fluid ounces.
Syrup of Raspberry (fruit),
Syrup of Pineapple (fruit), of each six fluid drachms.
Tincture of Cochineal, half a fluid ounce.
Mix.

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## IODOFORM.

BY J. HENRY CARSTENS, M. D.

As to some of the readers of the *Review* the mode of preparing this article, while to others its therapeutic uses may be of interest, I may be allowed to write a few words about this compound, which has come into such sudden and extensive demand.

Teriodide of formyl, or sesquiiodide of carbon, as it was formerly called, has a chemical composition of $C\ H\ I_3$. It was discovered in the year 1822, by Serullas, who procured it by adding chlorinated lime to an alcoholic solution of iodide of potassium. Claimed by Dumas to be analagons to formic acid, the iodine taking the place of the oxygen (also, chloroform and the like preparations).

A good method for making this compound is given by Wittstein. Two parts of carbonate of potassa, two parts of iodine, one part of alcohol, and five of water, are mixed in a retort, which is then heated by means of a water-bath, till the contents are perfectly colorless. After the retort has cooled, the liquid is poured into a beaker and allowed to settle. The yellow, scaly mass is then collected on a filter, washed thoroughly with water, and dried between filter-paper. Reaction (according to new nomenclature):—$6\ (K_2\ C\ O_3) + 16\ I + 2\ (C_2\ H_5\ HO)$. Five atoms of ozygen of the carbonate of potassa join $2\ (C_2\ H_5\ HO)$, forming $2\ (H\ C\ H\ O_2) + 3\ (H_2\ O) + 2\ (C\ H)$. $2\ (H\ C\ H\ O_2)$

combines with $K_2 O = 2 (K C H O_2, H_2 O)$ while $10 K + 10 I = 10 (K I)$, and 6 I and the 2 (C H) of the alcohol form $2 (C H I_3)$, carbonic acid escaping.

According to this, the gain of iodoform would be 38 per cent.; but the reaction never takes place so completely, and we must remember that all these changes take place at once, and that iodoform is very volatile (must never be made in an open vessel) the alcohol evaporates, and must be used in larger quantities; the excess of carb. of potass. does not retard, but seems to increase the reaction.

By using six ounces of iodine, only one ounce of iodoform is collected, or about 17 per cent. It would therefore be very expensive if we could not make use of the filtrate for making iodide of potassium. This liquid contains, besides traces of iodoform, the balance of the iodine as iodate of potassa and iodide of potassium, and also formate and carbonate of potassa.

Evaporate this solution to dryness, and triturate with one-eighth of its weight of charcoal, and then heat to redness for a short time in an iron crucible, then digest in alcohol and filter; the residue is carbonate of potass., while the filtered solution contains the iodide of potassium; the alcoholic solution is evaporated, and allowed to crystallize. By this means no iodine is lost, and teriodide of formyl ought to be not more expensive than iodine.

Iodoform appears in the shape of yellow, shining, six-sided scales, with a spicy odor (like saffron or iodine and chloroform); is volatile at ordinary temperature. Almost insoluble in water (one part in 13,000), but more so in alcohol (one part in 80). If it be used in a mixture, must avoid alcoholic solution of potassa, which decomposes it, forming formate of potassa and iodide of potassium:—$C H I_3 + 2 (K_2O) = K C H O_2 + 3 K I$.

Besides the well-known effects of iodine and its preparations, iodoform has the advantage of the former preparation of being stronger and more uniform in its action on the system; that is, does not corrode, nor act as a local irritant, and that, therefore, it may be given uninterruptedly. It is anodyne, and, consequently, often useful in neuralgia; produces, also, a local and partial anæsthesia of the colon. It has less anæsthetic powers than chloroform, although recommended by Eugenio Franchino (*Gaz. Sarda.*, 28, 1858) as a general anæsthetic in place of chloroform. First used by English physicians in form of ointment for exanthema; used by Lichtfield in porrigo and lepra; by Glover for psoriasis, impetigo, scabies, etc.; also recommended for croup (internally), and used with good success (*Monthly Journal, Feb.*, 1848). On the recommendation of Moretin and Mouzard (*l'Union*, 1857), used as a local anæsthetic, in the form of suppositories, in the prostrate; it also seems to relieve tenesmus, easing defecation.

Iodoform has lately been prominently brought to the notice of physicians in this country as a remedy for chronic ulcers (Proc. Penn. State Med. Soc., 1868), obstinate neuralgia, scrofula, strumous opthalmia, consumption, and even in cancer is stated to have relieved the excruciating pain of this malignant disease, without seeming to arrest the same (*Med. and Surg. Rep.*, Phil., Vol. 16, 17, 18). It is also a valuable dressing in chancre.

It is best administered in pill form, one to two grains, three times a day. Quevenne's iron may often be advantageously added. Externally it is used as an ointment, one-half to one drachm of iodoform to one ounce of lard, or it is dissolved in hot alcohol, and glycerine added; these to be used *pro re nata.—Detroit Rev. of Medicine.*

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# AMOUNT OF ARSENIC IN PHOSPHORUS OF COMMERCE.

BY J. C. RADEMAKER.

Frequently preparing dilute phosporic acid according to the process of the U. S. P., I always pass a current of sulphydric acid through the solution, in order to free it from all substances precipitable by that agent in acid solutions, and invariably obtain a yellowish precipitate, which upon examination proves to be sulphide of arsenic.

In order to find the amount of arsenic present in a given quantity of phosphorus, the following process was resorted to:

One hundred grammes of phosphorus were oxidized with nitric acid, the solution diluted and the arsenic precipitated as a sulphide ($AsS_5$) by means of sulphydric acid, the solution allowed to rest for 6 days. The precipitated sulphide of arsenic was collected on a filter and washed, transferred to a small evaporating dish and oxidized with nitric acid, and reduced by means of sulphurous acid to arsenious acid, and precipitated in the form of $AsS_3$, by means of sulphydric acid; the precipitate digested with ammonia, in order to free it from the small amount of sulphur present, the solution filtered from the undissolved matter, and evaporated, dried and weighed, and found to weigh 15 grains, or nearly one gramme.—*American Journal of Pharmacy.*

LOUISVILLE, Oct. 6, 1870.

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# IODOFORM AS A MEANS TO DETECT ALCOHOL.

A. Lieben, in the *Annal. der Chem. & Pharm.* 1870, *Suppl. Bd.* vii, 2, describes a method of detecting ethyl alcohol by the fermentation of iodoform. In the simple case when the presence of alcohol in a watery solution has to be determined, the sample is warmed in a test tube, a few drops of an iodinized potassium iodide solution are added, and afterwards a few drops of potassium hydrate solution. If the quantity of alcohol is not too small, a turbidity results by the formation of microscopically small yellow crystals of iodoform.

Hager finds this reaction very accurate, and states that it detects alcohol in liquids containing but 1.2000th after about one day's standing. The crystals are remarkable and beautiful by the variety of their star-shaped arrangement. Hager suggests the following *modus operandi:* The reagents used are a solution of potassium iodide in 5—6 times its weight distilled water and oversaturated with free iodine, and a solution of potassium hydrate of about 10 per cent. strength. To the liquid to be examined 5—6 drops of the latter solution are added. After warming to about 50° C. so much of the potassium iodide solution is added drop by drop that its color, after gentle agitation, remains yellowish-brown; then the liquid is carefully discolored by the addition of a few drops of the potassium hydrate solution. When set aside the iodoform crystals deposit, and are recognized under the microscope.

The process is obvious; it is effected not alone by ethyl alcohol, but by a number of different substances, among which are aldehyde, acetone, gummi, sugar, lactic acid, methyl alcohol, propyl alcohol, and many volatile oils. The formation of iodoform is *not* produced by amyl alcohol, ether, ethyl chloride, chloroform, chloral hydrate, glycerin, phenol, and by acetic, benzoic, butyric, citric, formic, oxalic, succinic, valerianic and tartaric acids.

### DETECTION OF ALCOHOL IN CHLOROFORM AND CHLORAL HYDRATE.

This test is, according to Hager, superior to any for the detection of alcohol in chloroform and chloral hydrate:

*Chloroform.*—To determine the presence of alcohol in chloroform 2 vol. chloroform are mixed with 5 to 10 vols. of water, of about 50° C. The liquid, after some shaking, is poured on a filter previously completely saturated with water. The filtrate is then examined as described above. After 12—24 hours depositing the sediment is examined under the microscope.

*Chloral Hydrate.*—Chloral forms with ethyl alcohol chloral alcoholate, corresponding to chloral hydrate in its chemical and physiological properties. Since the equivalent weight of ethyl alcohol is five times greater than that of water, it is of considerable pecuniary advantage to the manufacturer to bring the chloral alcoholate into the market instead of the hydrate; besides, the former crystallizes finer and more solid.

The examination is made with a solution of the sample in distilled water, in the above given mode. When discoloring the iodinized liquid, each drop of the potassium hydrate solution produces turbidity, which, however, disappears on gentle agitation. If the sample contains alcoholate, the liquid remains more or less turbid, or deposits iodoform crystals after a time, although this is partly soluble in the presence of chloral. Of some commercial samples examined by Hager, Schering's chloral hydrate was the only one entirely free from alcoholate.—*Amer. Jour. of Pharmacy from Pharm. Centr. H.* 1870, No. 18.

# ADULTERATED SYRUP.

A correspondent sends us the following paragraph which is going the rounds of the papers, and by its misstatements injuring the sale of genuine, unadulterated sugar-house syrup, and aiding the sale of the adulterated article which it professes to expose and condemn.

> "John H. Pope, druggist, of New Orleans, says that the substance known as 'sugar drips,' and retailed as 'golden syrup,' contains no sugar at all, but is produced by the destructive action of strong sulphuric acid (oil of vitriol) upon starch. To test the difference between this and cane syrup, dissolve a teaspoonful of the 'golden syrup' in a wine glass of rain water; then add a few grains of tannic acid, when it will turn black as ink if the article is spurious. If the acid be not convenient to procure, make a cup of strong tea, (which contains tannin,) and add a teaspoonful of the 'golden syrup,' and a fair quality of ink will appear."

Genuine sugar-house syrup, "golden syrup," is the liquor drained from the crystallized sugar of the sugar-house, after all the sugar that can be profitably extracted from raw sugar has been separated.

The impure, dark-colored, raw sugar of the plantation is dissolved in water, purified, filtered and decolorized. It is then boiled down in the vacuum-pan till it begins to granulate, when it is run into molds to cool.

The loaves are drained, cleansed with a saturated solution of pure sugar in water, and sent to market as lump, crushed, powdered and granulated, "A" sugar.

The syrup which drains out of the loaves, called "greens," is again purified, decolorized, and boiled down to crystallization. The crystals are separated in the centrifugal machine, and sold as a very light-colored coffee sugar. The *greens* from this sugar yield by purification, decolorization, and boiling, a light yellow sugar. The last *greens*, after three successive crystallizations of sugar, are purified and sold as "golden syrup." This syrup still contains a considerable quantity of crystallizable sugar, which cannot be profitably extracted, together with uncrystallizable sugar, coloring matter, and the substances which give to syrup its peculiar agreeable flavor, but whose exact nature is not known.

The adulteration complained of is the dilution of this pure sugar-house syrup with syrup made from starch, or the entire substitution of starch syrup for sugar-house syrup. We have no fault to find with this portion of the statement, but the test with tannic acid or strong tea is totally fallacious. It is simply a test for iron, which is much more likely to occur in genuine sugar-house syrup than in the starch syrup complained of. The raw sugar is manufactured in iron vessels; the tanks, pipes, coal filters, molds, and often the vacuum-pans in the sugar-house are made of iron, and as the solutions take up small portions of this metal, the syrup often, though not always, contains iron. The refiner is careful to prevent, as far as possible, the introduction of iron into the sugars and syrups, not because it is in any way injurious, but simply because if it occurs in the sugar to any extent, it produces a dark color when used in tea, which consumers dislike. As syrup is not used in tea, there is no real objection to a small proportion of iron; in fact, as iron is a good tonic, its presence is perhaps desirable. The

starch sugar which we have seen manufactured on a large scale in Europe, would not be as likely to contain iron. This test, therefore, is simply a test for iron, and not a test for adulterated syrup; in fact, guided by this false test, one would be likely to reject pure sugar-house syrup, and select the starch syrup instead. C. E. CHANDLER.
—*American Chemist.*

# ON FERMENTATION.

### BY PROFESSOR A. W. WILLIAMSON, F.R.S.

*Before the Society of Arts. Reprinted from the Pharmaceutical Journal, London.*

## LECTURE I.

I have sometimes wished, when building castles in the air, that I could, after a few hundred years, come back and see the state of science at that time. I am convinced that those who will look back, from such a period as a few hundred years hence, at the present state of our knowledge of nature, in any one department, will be surprised at its smallness; in fact, even now, when we work at all earnestly at any one part of the field of nature, we cannot refrain from feeling how little is our knowledge compared with our ignorance. But, if that is generally the case, I think it is peculiarly the case in those studies in which life is concerned; and the phenomena of fermentation have that peculiarity that they consist of processes in which vital organisms are concerned, and in which there is every reason to believe that vital organisms, or living beings, take an active and leading part. I need not say that, for that reason, the explanations which we have, even of the simplest and best known of the phenomena of fermentation, are, as yet, mere sketches of the reality. It is, however, not the less useful or the less important to know them for that reason.

When we chemists are classifying substances, we adopt a principle of classification which I think is almost inevitable, but it may be as well that I should mention what it is. We put the simple things together, and the complex or difficult things together, and then we try to put between them, in as regular an order as possible, the intermediate links of the chain by which they can be connected; and I believe that our best—I might almost say our only—explanations consist in thus arranging, in a natural order, the facts which we have to consider, and then viewing them, and stating what we see, in the clearest and least ambiguous terms. Now, the term "organic," as applied to a certain class of chemical substances, might be replaced—and I think, for some purposes, ought to be replaced—by the term "complex." The substances which we are in the habit of including under the term organic are peculiarly complex; in fact, they are the most complex with which we have to do. The phenomena of fermentation relate mainly to them, and consist principally of a process of change,—the breaking up of those organic bodies into rather less complex substances than themselves,—a process of partial analysis.

Of course, when I say that, I give what I conceive to be a characteristic idea of the general method, and I must not be supposed to assert that all processes of fermentation are analytical.

Amongst the characteristics which, I think, are particularly useful and interesting, as serving to distinguish organic from inorganic, complex from simple substances, is their different behavior under heat. I have found it exceedingly interesting and instructive to bear in mind the fact that while simple and inorganic compounds, as we generally call them, are sometimes destroyed and resolved into other compounds by the action of a high temperature, yet many of them are not. Amongst inorganic substances we find some which are broken up or changed by exposure to a high temperature, but there are others which can stand even the highest temperature without undergoing any permanent change, that is to say, they return, on cooling, to the same state in which they were before the heat was applied. With organic substances that is not the case. All organic bodies are broken up into minute particles, and assume new arrangements, when they are heated to a sufficiently high temperature; and that is, I think, a distinction which is of considerable theoretical as well as perhaps of some practical importance.

The processes of breaking up which are effected by heat upon organic bodies are, in the very great majority of cases, different from those which are effected by the action of these wonderful little organisms, the ferments; and it is a peculiarity of the action of the ferments that they effect the breaking up—the analysis—of complex organic substances, and form products which, for the most part, we have obtained from those materials by no other process.

Amongst the processes of fermentation, there is one which, from its pre-eminent importance, and from the fact that we have had occasion to study it more fully than any other, ought to be first mentioned. I allude to the process of fermentation by which alcohol is formed artificially. I may say, indeed, it is the only process by which alcohol is ever made. It is a process which consists in breaking up some kind of sugar, for sugar is a word which, although popularly restricted to one particular substance, which is extracted sometimes from the sugar-cane and sometimes from beet-root, is used by chemists in a more general sense, serving to characterize a family of bodies which have much in common with one another, being for the most part all of them sweet, and containing the same elements, but in slightly different proportions. They all possess many properties which are of some importance. These different kinds of sugar are broken up by the action of ferment into alcohol, and also into another product, carbonic acid gas, which has been long known, and for a long time the process of alcoholic fermentation was supposed to consist simply in a separation of sugar into these two products, alcohol on the one hand and carbonic acid on the other. A more careful examination of the products has shown, however, that these two never appear alone. I believe I may safely say, from the researches of Pasteur and others, that no case of the formation of alcohol by fermentation has been known to occur in which several other products have not been formed simultaneously with these two. With regard to the difference of properties of these two bodies, there are one or two points of some little interest, especially this one, that whereas alcohol is an eminently combustible substance, and is well known to have properties of that kind, being frequently used as fuel, on the other hand, carbonic acid, the other chief product, is completely burnt; it is a substance incapable of undergoing any chemical change whatever analogous to combustion. Alcohol is a substance which I need not show you, although in its pure state it is not very common; but I will, in order to remind those of you who may be less familiar with its leading properties, make a little carbonic acid by a short process. I will put a little muriatic acid upon some white marble, and the apparent ebullition which you see takes place is known to you all as due to the liberation of carbonic acid. You might imagine the thing to be fermenting, only that the process in that case would be less rapid. Now, if I plunge this little burning paper gradually into the jar containing the carbonic acid, it will burn more and more faintly, and get extinguished when it enters the gas; it is totally impossible to set fire to the gas. And there is one other fact that we may notice at the same time—the great specific gravity which characterizes this gas. I will show you that, in this way. I will go through the motion of pouring from this jar containing it into another smaller jar, and no doubt the heavy carbonic acid will pass from the jar in which I first collected it into the lower one, where we shall find it by means of the taper as before. You see that, on lowering the lighted taper into this small jar it is extinguished as it was before. I will show you the test by which we usually discover the presence of carbonic acid. I have here some water containing lime in solution,—some lime-water,—and I will pour it into the large beaker glass, in which there is probably still some carbonic acid left. You see the solution immediately becomes turbid, or, as we express it, a precipitate is formed by the combination of the carbonic acid with the lime-water. A compound is formed, which is nearly insoluble in the water, called carbonate, which goes down as a precipitate.

In addition to alcohol and carbonic acid, I ought to mention another kind of alcohol, which occurs to a considerable extent in some distilleries where raw grain or potato-starch is used. This substance imparts to the product a very unpleasant odor, and some unwholesome qualities. It is known by the name of fousel oil. It does not mix with water, and if I were to pour some of it on water it would float, without dissolving to any considerable extent. There are some other products which are even more interesting and important; two especially I ought to mention. One is the clear substance which you see in this bottle, and which you might imagine to be oil; it is a fluid largely made now, and known by the name of glycerine, but in chemical language I should say that this was an alcohol. It is a substance which, by tasting, you might mistake for sugar, for it possesses a sweet taste, resembling sugar, but, to chemists, it is a kind of alcohol, and its appearance during fermentation, together with ordinary alcohol, is no doubt due to a process of the normal kind.

Another product which I might compare to the carbonic acid which

I just now showed you, is this beautiful crystalline acid substance, which has been long known by the name of succinic acid. It got that name from the fact that it was originally prepared from amber. By subjecting the amber to dry distillation, succinic acid, among other products, is formed. Glycerine and succinic acid, as well as common alcohol and carbonic acid, are always formed when any kind of sugar is made to decompose by the process which is termed alcoholic fermentation; and it is seldom that there are not other—and probably, in smaller quantities, several other—products formed besides those four. In fact, the different kinds of spirit which are obtained by the process of fermentation and subsequent distillation,—I mean those kinds of spirit to which no artificial flavoring material is added (gin is a general name given to certain spirits which are flavored by artificial means), such as brandy, rum, and others,—owe their distinctive peculiarities to the presence of small quantities of volatile substances which are formed during the process of fermentation, regarding which a good deal has been observed, and several important facts have been collected.

There is another process of fermentation which I must mention, for it is important from its frequent occurrence, and that is a process by which another kind of sugar usually, but sometimes common sugar, is transformed. The substance which most naturally undergoes this fermentation is milk-sugar. These hard lumps in this bottle, which, if you were to take out and taste, you would not imagine to be sugar, are made by the crystallization of the solid substance in whey. The whey is evaporated carefully to a small bulk, and this substance which results is known by the name of milk-sugar. When a solution of this is mixed with cheese, which is the best ferment for the purpose, it gradually turns acid. I dare say it is known to all of you that milk itself, which contains this body, and cheese, or rather caseine, dissolved with it, together with the fatty globules of milk, when exposed to the air, turns acid. That acidity is due to a change which takes place in the sugar. The sugar disappears gradually, and is transformed into an acid substance of which I have a little bottle here. It is a strong acid, and here in another bottle are a few of its salts,—a lime salt and a zinc salt, which is a very beautiful and characteristic compound. I shall have occasion hereafter to show you a large bottle which is now at work, in which I dissolved, not this particular kind of sugar, but the ordinary sugar. I put with it a quantity of calcic carbonate, and some old, lean cheese, with a considerable quantity of water. The mixture was kept at a temperature above blood heat for some considerable time, and a compound of lactic acid is being formed. That is a process analogous in its general features to the fermentation which forms alcohol, but it is a change of sugar in which no alcohol is formed. Sometimes there is a trace of alcohol, but there is not necessarily any, and no carbonic acid is formed; but instead of these products, the elements of the sugar break up into different groups, and arrange themselves in another manner. That is really the nature of the process, as far as our most careful experiments have gone, and the acid which we make in that way, which is lactic acid, or acid of milk, is really sugar, of which the elements are arranged in a different way, so as to acquire acid properties.

The third process, which I must mention from its remarkable products, is one which, perhaps, in some respects, ought rather to be compared with putrefaction, for it is a process which has many of the most important characteristics of putrefaction. In order to deal with the question of fermentation generally, it is necessary to allude to some varieties of such chemical changes which are usually classed under the term putrefaction. As a general rule, I think the characteristic of processes of putrefaction is mainly the unpleasant nature of the products which are formed. It is not long since a distinguished chemist, in speaking of alcoholic fermentation, said that it is really a putrefactive process; and in its intimate nature it is, as far as we know, a process much like the truly putrefactive processes, and different from the processes of eremocausis or oxidation. This other process to which I allude consists in forming the acid substance which I have here, and which I will not open, because it is not a very pleasant body. It is a substance which is known, although I believe not very commonly, in butter. The peculiar rancid odor which butter acquires when it is kept too long, especially in warm weather, is due to a transformation of some of its materials into this particular acid, which Chevreul, a very distinguished French chemist, separated from butter, and he named it from that circumstance butyric acid. If we leave some of this product of the last fermentation,—some of this lactate of lime, the lime salt of lactic acid,—under the same conditions in which it was formed, that is, if we leave it in the same vessel in which it had been formed from the milk or sugar, and leave cheese with it, and keep the mixture warm, the lactate will gradually decompose, and carbonic acid will be given off together with hydrogen gas, and at the same time we find that the lactic acid will be decomposed, and in place of it we get this butyric acid, and generally some valerianic acid and a little acetic acid.

Amongst the processes which really are analogous to fermentation in their nature, but which differ in one particular, I must mention one other, the process of forming vinegar, or acetic acid. This large bottle contains vinegar in a form which most of you, I dare say, have not seen. These fine white crystals are the pure substance which, mixed with water in an impure state, are generally known by the trivial name of vinegar. We call that acetic acid, or hydric acetate. The formation of this body from alcohol represents a variety of fermentation which is of considerable importance and of frequent occurrence. Everybody who has noticed the process which takes place when animal or vegetable matter is left to itself in contact with air, especially in moist localities, must have observed that there is a gradual disappearance of the organic matter. For instance, if you leave a piece of wood in a moist place, under certain conditions of very frequent occurrence which are favorable to this process, the wood gradually gets soft, and becomes transformed into a brown substance, and if you leave it long enough—in this country, several years generally would be needed for this purpose—it gradually disappears. If you were to put a piece of that decomposing wood into a closed glass vessel, and examine the air above it, you would find that the wood was really burning. I am using the word combustion in the ordinary chemical sense—I mean by that word that the oxygen of the air which you have enclosed with the wood is being taken up by the wood, and the products of combustion, carbonic acid and water, are being formed from the substance of the wood. One great class of the processes of fermentation is of that kind. They consist not in a mere breaking up of the materials already contained in the organic substance, but a change of their arrangements, which is due, more or less, to the absorption of oxygen, and this formation of acetic acid or vinegar is a case of that kind. In fact, if we were to leave some ordinary fermented wort in an open vessel, so that the alcohol were left there in the mixture in which it had been formed, we should find that the alcohol would gradually disappear and give place to an acid substance. The process is well known to wine-makers and to brewers, and their art consists, amongst other things, in the avoidance of this process of the oxidation of their alcohol. While the acetic acid is being formed, oxygen from the air is taken up, and in that respect this process of acetic fermentation differs from the other three processes of fermentation which I have described. When you make alcohol and carbonic acid from sugar, the air takes no part in the process; when you make lactic acid from the sugar, the air is not wanted; and when you make butyric acid from lactic acid, then again the air may be completely excluded and the process will go on without it. But when you make acetic acid from alcohol, you must of necessity allow the free and continuous access of air, and the air gives up some of its oxygen to this fermenting alcohol, to transform it into acetic acid and water by a true process of fermentation.

(*To be continued.*)

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## MANNER OF APPLYING CEMENTS.

Quite as much depends upon the manner in which a cement is *applied* as upon the cement itself. The best cement that ever was compounded would prove entirely worthless if improperly applied. We have hundreds of receipts for glues, pastes, and cements of different kinds, and yet the public is constantly on the *qui vive* for new ones, and no more acceptable receipt can be sent to our popular journals than one for a new cement. Now, the truth is, that we have cements which answer every reasonable demand, when they are properly prepared and properly used. Good common glue will unite two pieces of wood so firmly that the fibres will part from each other rather than from the cementing material. Two pieces of glass can be so joined that they will part anywhere rather than on the line of union. Glass can be united to metal, or metal to metal, or stone to stone, and all so strongly that the joint will certainly not be the weakest part of the resulting mass. What are the rules to be observed in effecting this ?

The first point that demands attention is to bring the cement itself into intimate contact with the surface to be united. If glue is employed, the surface should be made so warm that the melted glue will not be chilled before it has time to effect a thorough adhesion. The same is more eminently true in regard to cements that are used in a fused state, such as mixtures of resin, shellac, and similar materials. These matters will not adhere to any substance unless the latter has been heated to nearly or quite the fusing point of the cement used. This fact was quite familiar to those who used sealing-wax in old days. When the seal was used rapidly, so as to become heated, the sealing-wax stuck to it with a firmness that was annoying—so much so that the impression was in general destroyed—from the simple fact that the sealing-wax would rather part in its own substance than at the point of adhesion to the stamp. Sealing-wax is a very good agent for uniting metal to glass or stone, provided the masses to be united are made so hot as to fuse the cement; but, if the cement is applied to them while they are cold, it will not stick at all. The fact is well known to itinerant venders of cement for uniting earthenware. By heating two pieces of delf so that they will fuse shellac, they are able to smear them with a little of this gum, and join them so that they will rather break at any other part than along the line of union. But although people constantly see the operation performed, and buy liberally of the cement, it will be found in nine cases out of ten the cement proves worthless in the hands of the purchasers, simply because they do not know how to use it. They are afraid to heat a delicate glass or porcelain vessel to a sufficient degree, and they are apt to use too much of the material, and the result is a failure.

The great obstacles to the junction of any two surfaces are air and dirt. The former is universally present, the latter is due to accident or carelessness. All surfaces are covered with a thin adhering layer of air which it is difficult to remove, and which, although it may at first sight appear improbable, bears a relation to the outer surface of most bodies different from that maintained by the air of a few lines away. The reality of the existence of this adhering layer of air is well known to all who are familiar with electrotype manipulation. It is also seen in the case of highly polished metals, which may be immersed in water without becoming wet.

Unless this adhering layer of air is displaced, the cement cannot adhere to the surface to which it is applied, simply because it cannot come into contact with it. The most efficient agent in displacing this air is heat. Metals warmed to a point a little above 200° become instantly and completely wet when immersed in water. Hence, for cements that are used in a fused condition, heat is the most efficient means of bringing them in contact with the surfaces to which they are to be applied. In the case of glue, the adhesion is best obtained by moderate pressure and friction. Another very important point is to use as *little* cement as possible. When the surfaces are separated by a large mass of cement, we have to depend upon the strength of the cement itself, and not upon its adhesion to the surfaces which it is used to join; and, in general, cements are comparatively brittle.—*Canadian Phar. Journal, from English Mechanic.*

## DIRECTIONS FOR PREPARING DISINFECTANTS.

The Chemical Society of Berlin have, through a committee, published a list of the most approved disinfectants, and the degree of concentration in which to apply them.

*Permanganate of Potash.*—One part of the pure salt dissolved in 100 parts of water. Where the crude material is used, 5 to 10 parts of it to 100 of water will suffice. This disinfectant acts upon liquids, and has little effect on solids.

*Carbolic Acid Water*—Is obtained by dissolving 1 part of the pure crystallized carbolic acid (which can be rendered fluid by immersion in hot water) in 100 parts water. Crude carbolic acid ought to be taken in double the quantity.

*Carbolic Acid Powder*—Is prepared by mixing 100 parts peat, gypsum, earth, sand, sawdust or charcoal powder with one part carbolic acid, in water, Double the quantity of the crude acid must be taken.

*Carbolic Acid Wash.*—Mix 1 part carbolic acid with 100 parts milk of lime.

*Chloride of Lime.*—1 part in 100 parts water.

*Solutions of Metallic Salts.*—Better to prepare saturated solutions in water, and frequently stir.

*Suevern's Mass*—Is composed of 100 parts slaked lime, 15 parts coal tar, and 15 parts chloride of magnesium in water.—*Journal of Applied Chemistry.*

## BLEACHING SPONGES.

Sponges can be bleached by first soaking them in hydrochloric acid, diluted with 1½ parts water, until no more carbonic acid is given off; then wash in pure water, and afterwards leave in a bath composed of 2 lbs. hyposulphite of soda, 12 lbs. water and 2 lbs. hydrochloric acid. If the sponge be afterwards dipped in glycerine, and well pressed, to remove excess of liquid, it remains elastic, and can be used for mattrasses, cushions and general upholstery. Sponge mattrasses prepared in this way are now finding great favor. It is, of course, not necessary to bleach the sponge where it is intended to be used for such purposes.—*Journal of Applied Chemistry.*

## NEW METHOD OF DISTINGUISHING VEGETABLE FIBERS.

Dr. Isidor Walz gives, in the *Manufacturers' Review*, a summary of M. Vetillard's method of distinguishing the fibers of linen, hemp, cotton, jute, China grass, New Zealand flax, which is of such easy execution that we print the whole of it for the benefit of our subscribers.

If a woven or spun fibre is to be examined, it must first be disintegrated into the single fibers, and any color or finish must be removed as completely as possible. Vertical and longitudinal microscopic sections are next made. These are rendered transparent by glycerine or chloride of calcium, and treated with tincture of iodine, made by simply dissolving iodine in a solution of iodide of potassium. The excess of this tincture is removed, a drop of dilute sulphuric acid added, and the sections examined by the aid of the microscope.

*Linen Fiber.*—Bundles of smaller fibers, with a fine canal in the center, long, uniformly thick and pointed at the ends. Longitudinal section: the fibers are colored blue, the canal yellow. Cross section: regular polygons, loosely connected, colored blue; centers yellow.

*Hemp.*—Fibers aggravated; each fiber covered with a thin skin, colored yellow. They are thick and less uniform than the linen fibers. The ends are thick and of the shape of spatulas, and become blue or greenish blue with iodine. Cross section: irregular polygons, firmly connected; rim yellow, the mass blue, the center colorless.

*Cotton.*—Longitudinal section: single fibers, spirally wound on their own axis, with a central canal and broad ends; colored blue by iodine. The cross sections are rounded in the shape of kidneys, and colored blue, with yellow spots interspersed.

*China-grass.*—Longitudinal section: fibers separated lengthwise, of varying thickness. The interior canal is often filled with a yellow granular substance, which is colored brown by iodine. The fiber is turned blue by iodine. Cross section: irregular, with re-entrant angles, and little cohesion. The fibers are stouter than all other fibers, and are turned blue by iodine.

*Jute.*—Fibers strongly coherent, the ends undulating and difficult to separate. Central canal wide, empty, and gently rounded at the ends; colored yellow. Cross section: polygons strongly coherent and regular, much like those of hemp, but the central opening is larger; colored yellow, darker at the rim.

*New Zealand Flax.*—Bundles of cells of the leaves, easily separated with a needle into stiff little fibers, provided with a canal of uniform width. The sides are rolled inwards; colored yellow. The cross section resembles that of jute, but the corners of the polygons are rounded off. They are colored yellow by iodine tincture.—*Journal of Applied Chemistry.*

# ATTFIELD'S SATURATION TABLES.*

## FOR ACIDS AND ALKALINE CARBONATES.

EQUIVALENT WEIGHTS of Citric Acid, Tartaric Acid, Carbonate of Potassium, Bicarbonate of Potassium, Carbonate of Sodium, Bicarbonate of Sodium, Carbonate of Ammonium, and Carbonate of Magnesium; repeated (in BLACK) for 20 parts of each, and incidentally (in roman) for other proportions. (Exact to two places of decimals.)

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Citric Acid; $(H_3C_6H_5O_7, H_2O) \div 3 \times 2 = 140$ | **20.00** | 18.66 | **16.96** | **14.00** | **9.78** | **16.66** | **23.72** | **29.31** |
| Tartaric Acid; $H_2C_4H_4O_6 = 150$ | 21.43 | **20.00** | **18.26** | **15.00** | **10.49** | **17.85** | **25.42** | **31.41** |
| Carbonate of Potassium; $K_2CO_3 + 16\%\,Aq = 164.285$ | **23.47** | **21.90** | **20.00** | 16.43 | 11.48 | 19.52 | 27.87 | 34.40 |
| Bicarbonate of Potassium; $2(KHCO_3) = 200$ | **28.57** | **26.66** | 24.34 | **20.00** | 13.98 | 23.81 | 33.89 | 41.90 |
| Carbonate of Sodium; $Na_2CO_3, 10H_2O = 286$ | **40.08** | **38.13** | 34.81 | 28.60 | **20.00** | 34.04 | 48.47 | 59.98 |
| Bicarbonate of Sodium; $2(NaHCO_3) = 168$ | **24.00** | **22.40** | 20.45 | 16.80 | 11.74 | **20.00** | 28.47 | 35.18 |
| Carbonate of Ammonium; $(N_4H_{16}C_3O_8) \div 2 = 118$ | **16.85** | **15.73** | 14.36 | 11.80 | 8.25 | 14.04 | **20.00** | 24.71 |
| Carb. of Magnes. $((MgCO_3)_3, Mg2HO, 4H_2O) \div 4 = 95.5$ | **13.64** | **12.73** | 11.62 | 9.55 | 6.68 | 11.37 | 16.18 | **20.00** |

The amount of acid given in any column will saturate the amount of carbonate in the same column, and *vice versa*.

The amounts of carbonate in any column are equal to each other in chemical power. The amounts of acid are also equivalent.

Lemon Juice (sp. gr. 1039) contains, on an average, 7 per cent. by weight of citric acid.

THE SAME TABLE IN ROUND NUMBERS, FOR PURPOSES OF PRESCRIBING AND DISPENSING. (The old names in Latin.)

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Citric Acid (Acidum Citricum, B.P.) | **20** | 19 | **17** | **14** | **10** | **17** | **24** | **30** |
| Tartaric Acid (Acidum Tartaricum, B.P.) | 22 | **20** | **18** | **15** | **11** | **18** | **26** | **32** |
| Carbonate of Potassium (Potassæ Carbonas, B.P.) | **24** | **22** | **20** | 16 | 12 | 20 | 28 | 35 |
| Bicarbonate of Potassium (Potassæ Bicarbonas, B.P.) | **29** | **27** | 24 | **20** | 14 | 24 | 34 | 42 |
| Carbonate of Sodium (cryst.) (Sodæ Carbonas, B.P.) | **40** | **38** | 35 | 28 | **20** | 34 | 49 | 60 |
| Bicarbonate of Sodium (Sodæ Bicarbonas, B.P.) | **24** | **22** | 20 | 17 | 12 | **20** | 29 | 36 |
| Carbonate of Ammonium (Ammoniæ Carbonas, B.P.) | **17** | **16** | 14 | 12 | 8 | 14 | **20** | 25 |
| Carbonate of Magnesium (Magnesiæ Carbonas, B. P.) | **13** | **13** | 11 | 9 | 7 | 11 | 16 | **20** |

The Table is read thus: 20 grains of Citric Acid will saturate 29 grains of Bicarbonate of Potassium; 20 grains of Bicarbonate of Sodium will saturate, or be saturated by, 18 grains of Tartaric Acid; 11 grains of Tartaric Acid=8 grains of Carbonate of Ammonium; 20 grains of Bicarbonate of Sodium are equivalent to, or will do as much work as, 34 grains of Carbonate of Sodium; 14 grains of Citric Acid are as strong as 15 of Tartaric Acid. It is occasionally convenient to double the numbers, halve them, or take some other proportion; also to employ them in weights other that grains.

Lemon Juice contains, on an average, 32½ grains of Citric Acid in one fluid ounce, or 4 grains per fluid drachm.

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* From ATTFIELD'S "Chemistry: General, Medical, and Pharmaceutical." VAN VOORST, Paternoster Row, London.

## EDITORIAL.

The fourth volume of The Pharmacist, beginning with this issue, is inaugurated with the typographical changes alluded to in the last number. By this change, and the omission of the price-current, we are enabled to give a large additional amount of reading matter, equivalent to eight pages, or an increase of more than thirty-five per cent. over previous issues. While we regard the *quality* as of much greater importance than the *quantity* of matter which we present to our patrons, we take great pleasure in noting these changes as calculated to add to the interest of our journal. As to the quality of its contents, we think our readers will be satisfied with the assurance that our regular contributors who have furnished so many excellent papers to previous volumes, will continue their assistance; we have also the promise of interesting articles from our pharmaceutical friends both East and West. On our own part, we shall endeavor to incorporate in each issue such selections and translations as will represent the progress of pharmacy and pharmaceutical chemistry at home and abroad; in short we shall labor to make The Pharmacist acceptable and of practical assistance to every druggist.

We believe our readers will be pleased with the changes we have introduced, and we hope they will give substantial evidence of their approval by responding to the bills attached to the present number, as we shall forward them to all who are in arrears, or whose annual subscriptions are now due. Notwithstanding the material increase in the cost of publication, the price will remain unchanged—one dollar per annum, postage included, payable in advance.

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In view of the improvements instituted in the current volume of The Pharmacist, our subscription list should be greatly extended. This can be readily done if our friends will but make a slight personal effort in the direction of our welfare. Members of The Chicago College of Pharmacy, especially, should consider themselves as called upon to extend our circulation ; with their co-operation we can anticipate a very great increase in our subscription list.

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## PHARMACEUTICAL INFELICITIES IN ENGLAND.

Our city and country are not the only places where physicians and apothecaries sometimes disagree, as we learn in perusing our foreign exchanges. A bitter wordy strife, instigated by the attacks of the *Lancet*, has been waged for some time between these highly respectable and scientific bodies, and as usual in such cases, some tender spots have been bared on either side. The physicians are incensed at the extent to which counter-prescribing is carried on by pharmaceutical chemists, and incidentally aver that the charges upon their prescriptions are extortionate.

We must acknowledge that on the first ground the physicians have just cause of complaint. The system of combining the vocations of prescriber and dispenser can scarcely be said to exist in this country. It is condemned by our pharmaceutical associations, and no member can indulge in such practice without violation of the ethical code.

We regard this as eminently just and proper; and however much our English bretheren may exceed us in some respects, they are certainly far behind in this.

The discussion has naturally brought forward some of the shortcomings of certain doctors of fair repute, and it seems that they are fully up to the standard allotted to quackery in our own community. We allude to the practice of certain so-called physicians who, from private motives, well understood by the favored but equally unscrupulous apothecary, designate preparations by secret names or hieroglyphics, which to the uninitiated are about as intelligible as as much Chinese.

A certain Watson Bradshaw having indited such a prescription, which went astray, a copy of it was sent to the *London Pharmaceutical Journal* for publication and elucidation. The latter request could not be complied with, of course, but its publication called forth a note from the prescriber, correcting the "false Latinities" which the published formula ascribed to him; this the editors allowed to pass unnoticed, whereat the critical Bradshaw waxed wroth, and demanded an apology or satisfaction. The editors kindly granted him the latter by publishing a *fac similie* of the original prescription. The writing is itself a curiosity, and scarcely more intelligible than the ingredients of his prescription. The eminent Bradshaw has now no cause of complaint since full justice has been rendered him—a justice which he doubtless enjoys, as did a certain Shylock, in urging his rapacious claim.

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IN this issue we commence the publication of the admirable lectures on "Fermentation," by Prof. A. W. Williamson, F. R. S., delivered before the Society of Arts, England. The learned lecturer has treated the subject thoroughly, developing everything known to the present time, and presenting it in a most attractive manner. These lectures will extend through several succeeding numbers of THE PHARMACIST.

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WE regret to learn that the *American Scientific Monthly* has been discontinued for want of proper support. A note from Prof. Hinrichs informs us that it will be succeeded shortly by a quarterly, "The School Laboratory."

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PAMPHLETS AND NEW PUBLICATIONS RECEIVED.—Proceedings of the Second Annual Meeting of the California Pharmaceutical Society, held at San Francisco, October 10, 1870. Also, the Constitution and Roll of Members. Octavo pp. 52. We have already alluded to the meeting of the Society of which the above is a full report, containing also the several interesting papers read at the session. Extracts from the latter we may hereafter present to our readers.

"Archives of Science and Transactions of The Orleans County Society of Natural Sciences." Editors—J. M. Currier, M. D., Newport, Vt., and Geo. A. Hinman, M. D., West Charleston, Vt. Published quarterly by J. M. Currier, M. D., Newport, Orleans county, Vt. Octavo pp. 62. Terms—$2.50 per annum, in advance; single copies, 75 cents. This new journal of the natural sciences entered upon its existence in October last. The initial number contains interesting articles upon the Pawnees; the Mineral Springs of Essex county, Vt.; Indian History; a complete Meteorological Report, besides other papers, and the Constitution and By-Laws of the Society. It is announced editorially that the science of Entomology, so important to agricultural interests, will receive a full share of attention.

"The Schoolmaster," published monthly. Octavo pp. 26. Editors—Professor Albert Stetson, Normal, Ill., and J. S. Baker, Chicago. John Hall, publisher, Chicago. There seems to have been a dearth of literature devoted to the discussion of educational interests, particularly in reference to common school instruction. "The Schoolmaster" seems to supply this vacancy by its bold and vigorous articles upon the various topics within its scope. It is a journal which should be read by every teacher, and by others interested in the cause of education. Terms $1.00 per year.

"The Young Pilot," an original monthly magazine, devoted to the interests of the youth of America. Published by the Young Pilot Publishing Company, Chicago. Terms—$1.00 per annum; single copies, 10 cents.

# THE PHARMACIST

AND

CHEMICAL RECORD.

VOL. IV. CHICAGO, FEBRUARY, 1871. No. 2.

## PHARMACEUTIC NOTES.

BY C. LEWIS DIEHL.

(*Continued.*)

*Blue Pill*, is one of the simple preparations of our Pharmacopœia that is seldom prepared by the apothecary; in fact its preparation is the exception and its purchase appears to be the rule. There are numerous reasons why it is not generally prepared by dispensers, first and foremost among which may be mentioned the labor attending the extinguishment of mercury. Quite a number of processes for facilitating this have been from time to time recommended, but none seemed to me so simple as one recommended some time ago by a writer in one of our pharmaceutic journals, which consists in agitating the mercury with a small proportion of tincture of tolu, and then incorporating it with the proper ingredients. Another reason appears to be that blue-mass, when made strictly according to the Pharmacopœia, soon becomes hard and unmanageable. Manufacturers, taking advantage of this, aim to produce a blue-mass which, while corresponding in mercurial strength to the officinal article, will retain its plastic condition, and thus they create a demand for their particular manufacture.

While engaged in the manufacture of blue-mass on a considerable scale, I soon found it necessary to change the ingredients in order to obtain a more plastic mass, and succeeded very well, with but one objection, namely: that the mass was liable to become somewhat tough, and consequently more or less difficult to roll out. In other respects the mass left nothing to be desired. By experiments lately made, I believe to have overcome this difficulty, but I can not say, as yet, that my experiments with tincture of tolu warrant the assertion that it affords a rapid and convenient medium for extinguishing mercury, without the application of more manual labor than is likely to be bestowed upon the object.

When one ounce of mercury is briskly agitated with half a fluid drachm of tincture of tolu, contained in a two ounce vial, it soon becomes divided into globules, and in perhaps one or two minutes these globules will be scarcely visible as such to the naked eye. Occasional brisk agitation for twenty to thirty minutes however, is necessary to so far extinguish the mercury as to render globules invisible through a lens of moderate power. After the mercury is so far extinguished it would appear an easy matter to mix it with syrup, honey or any other desirable fluid that, in the manufacture of blue-mass on a large scale, is employed as an extinguishing medium; but this I have found not to be the case, for when the mixture is stirred into the remaining ingredients for blue-mass, globules of mercury abundantly form, and delay the completion of the process considerably. This is probably owing to the action of the syrup or honey, &c., upon the tolu coatings of the minutely divided mercury, by which a portion of mercurial surface becomes exposed, and unites with another in a similar condition.

However, something is gained by the use of tincture of tolu, for I have prepared blue-mass in less than an hour—twenty to thirty minutes of which being consumed in briskly rubbing the mixture to entirely remove globular mercury.

If it were practicable to keep blue-mass in the form of 3-grain pills, as provided by the formula of our Pharmacopœia, there would be no necessity for a change in its ingredients. This not being the case, the formula should be so altered as to insure a mass that will keep its soft consistence for a reasonable period. It may be contended that the ingredients entering its composition are necessary to its remedial properties, for some authorities maintain that blue-mass owes its virtues to the metal in an oxidized condition, and the question may then arise, "*Do the ingredients of the officinal blue-mass specifically tend to promote this oxidation?*" It is reasonable to suppose that such is not the case, for otherwise much of the blue-mass of commerce, in every other respect properly prepared, would be found ineffective. I venture to doubt that either powdered liquorice root or the components of confection of rose are essential to the effectiveness of blue-mass, and propose for its preparation the following formula:

Take of Mercury,
    Finely powdered Marsh-mallow root, each one Troy ounce;
    Syrup,
    Glycerine, each 240 grains;
    Tincture of Tolu, 30 minims.

Introduce the mercury into a two-ounce vial containing the tincture of tolu, and agitate briskly, at short intervals, for thirty minutes, or until the mercury shall have become entirely extinguished; then weigh the syrup and glycerine into the vial, agitate briskly, and immediately incorporate with the powdered marsh-mallow, rubbing the mass until any globules of mercury formed shall have entirely disappeared.

Blue-mass is formed in this manner with less labor, in a shorter time, and of a better consistence, than by any other process known to me.

While the mass is decidedly firm, it will remain plastic for a long time, and can be rolled into pills that will keep their shape perfectly. After the addition of the liquid mixture to the powdered marsh-mallow, the mass retains a very soft consistence for a considerable time, requiring less laborious mixing than when confection of rose is used.

Regarding the use of tincture of tolu in the formation of blue-mass no decided opinion is offered, as I am still engaged with experiments, and hope in the next issue of THE PHARMACIST, to present some more satisfactory results.

In connection with this subject, I would offer a few hints regarding other pill masses, that may be familiar to some but new to others.

*Quinia Pills* are dispensed by me preferably, by forming the mass with the aid of glycerine, and rolling the pills in sifted arrow-root. A beautiful white pill is formed, which, by fastidious persons, is preferred to pills rolled in liquorice powder or lycopodium. Some authors object to the use of *glycerine*; on account of technical difficulties, but I have always found it the most convenient excipient for general pill making, having seldom to resort to any other. Then its tendency to prevent the pills from becoming hard, will fully compensate any additional labor that may now and then attend its use.

Several of our physicians prescribe sulph. quinia with tartaric acid, according to a formula published some years ago. Quinia pills so formed may possess some advantage over the simple Quinine pills, being probably more readily dissolved and assimilated. The following is the formula:

Take of Sulphate of Quinia, 30 grs.
Tartaric acid, 4 grs.
Water, 1 drop.
Mix, and make pills of the required quantity.

The single drop of water is sufficient to form 30 grs. of Quinia into a plastic mass, which must, however, be rolled into pills rapidly, else it becomes hard, and more water is required.

These pills, like the preceding, should preferably be rolled in sifted arrow-root; in fact all pills composed of colorless substances should be rolled in this powder, as it, apart from other considerations, necessitates the utmost cleanliness.

*Carbolic Acid* in pills is occasionally prescribed. I have never met with any particular formula, and suggest the following as convenient and satisfactory:

Take of Carbolic Acid, 1 part.
Powdered Elm bark, 3 parts.
Gum Arabic, 1 part.
Tragacanth paste, a sufficiency.
Mix, and make pills of the required size, which may be coated with tolu or silver leaf.

*Muriate of Ammonia*, when required in form of pills, demands very careful handling, on account of its ready solubility. By adding about ten per cent. of powdered gum arabic, and sufficient tragacanth paste to simply moisten, pills are readily formed by the aid of glycerine.

***Ammonio-ferric Alum*** is sometimes required in the form of pills. A handsome pill is produced by adding about one-eighth part of powd. gum arabic, and making the mass with glycerine, being careful to avoid an excess.

(*To be continued.*)

## "SULPHATE OF QUININE."

### *An old Fraud in a Dangerous Disguise.*

BY CHARLES BULLOCK.

Within the past few days there has been offered in this market a lot of sulphate of quinine (?) said to be five thousand ounces in quantity, purporting to be of the manufacture of Pelletier, Delondre et Levaillant, Paris. The bottles containing the drug bear the label, and the cork the seal, of that well-known firm.

An examination of the so-called sulphate of quinine (?) (which was offered at the market value, or thereabout, of quinine) shows that it contains scarcely a trace of quinine, but consists entirely of muriate of cinchonia mixed with small amounts of the other associated alkaloids of the bark.

The first impression was, that old bottles, from which the genuine labels had not been removed, had been used to perpetrate the fraud. A more careful examination, and comparison with a package known to be genuine, leads to the belief that the whole transaction—bottle, label, seal, and circular accompanying each bottle—is a counterfeit. This counterfeit, we are informed, is in the hands of parties in New York.

Language too strong can scarcely be used to condemn the baseness of such a transaction. It is bad enough to appropriate a well-known trade-mark, to obtain a market on the reputation of another; but to counterfeit label, circular, seal and trade-mark, to cover a medicinal article of different character and much less value, with *intent* to deceive, indicates a quality of heart needing but a little more schooling to make a first class rascal.

In the State of Pennsylvania, we have a law punishing the vendor of meats in a condition unsuited for consumption; but we believe there is no statute law in this State to reach the man who, for the sake of greed, wilfully deceives his fellow when struggling against the inroads of disease, by offering to him cinchonine under the counterfeit garb and at the cost of quinine, while the drug bears about the same relation to quinine in medicinal as it does in commercial value.

It is hoped that our New York brethren are better protected by laws bearing on the subject; and if they can discover the perpetrator of this fraud, and obtain for him a diploma insuring to him ten years' sojourn at Sing Sing, the general judgment of the profession will be—"served him right."

It is somewhat amusing to notice in the circular accompanying the spurious quinine, that the method of detecting adulterations, is copied from the original, and which affords a ready method of ***nailing the lie*** to every package of the counterfeit—

Viz: "1 gramme of sulphate of quinine, 4 grammes of ether, and 2 grammes of aqua ammonia, should form a clear solution."

PHILADELPHIA, Jan. 26, 1871.

—*Amer. Journal of Pharmacy.*

## DECOMPOSITION OF ACETATE OF MORPHIA IN SOLUTION.

BY JOHN M. MAISCH.

Read before the Philadelphia College of Pharmacy, Dec. 20, 1870.

That aqueous solutions of the salts of most officinal alkaloids cannot be kept for indefinite periods is well known to all pharmacists. Whether distilled water, or boiled and filtered hydrant water—the latter containing but traces of foreign matter—be used for such solutions, whitish floccules usually make their appearance after some time, and gradually assume a soft gelatinous consistence, with the appearance of algaceous growth. In the few instances in which the writer assayed such altered solutions of the sulphates of quinia and of morphia, a diminution of the amount of alkaloid has not been observed, and the appearance of this foreign body was therefore rather attributed to accidental organic impurities in the water, and this belief was strengthened by the fact that the bulk of these flocks varies in solutions made at different times, and after some time apparently does not increase, and that the presence of an excess of sulphuric acid prevents such a formation, or at least diminishes its amount.

It is also well known that a neutral solution of acetate of ammonia gradually deposits flocks, and that the liquid then assumes an alkaline reaction. This was first observed by Horst,* who attributes this decomposition of aqueous solutions of acetate and succinate of ammonia to the light, and recommends to keep them in a dark place; if ammonia was replaced by potassa or soda, this decomposition did not take place. I am not aware that the amount of ammonia has ever been estimated in the fresh solution and after the decomposition has taken place.

A solution of acetate of morphia is very prone to change; it soon acquires a brown yellowish color, and deposits a brown matter. A decomposition was already observed by E. Merck in 1837,† when experimenting about the best process for obtaining this salt dry, in a neutral condition; he states that the evaporation of its solution must be hastened at a low temperature by a current of air or other means, since it is decomposed at too slow an evaporation. But the nature of this decomposition is not stated.

Some months ago, Dr. Wm. T. Taylor, of this city, informed me that he prefers to use a solution of this salt for hypodermic injection, and that he had repeatedly observed the separation in the liquid of one or more crystals, after keeping it on hand for some time. A careful examination of a crystal proved it to be pure morphia, entirely free from acetic or other acid; with nitric and iodic acids, and with sesquichloride of iron, it showed the reactions characteristic for morphia; it had an alkaline reaction to test papers, and neither acetic, carbonic or any mineral acid could be discovered by the appropriate tests; heated upon platinum foil it was consumed without leaving any residue.

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*Archiv d. Pharm. 1823. Buchner's Repertorium, xviii, 481.

†Archiv d. Ph .xxiv, 46. Buchner's Repert. lxiv, 265.

The liquid had deposited a considerable quantity of a brown matter, and was of a pale brownish color. It was neutral to test paper, but with pure sesquichloride of iron acquired a reddish tint, which disappeared on the addition of muriatic acid. Acidulated with nitric acid, iodohydrargyrate of potassum occasioned a turbidity. Evidently a minute portion of acetate of morphia remained still in solution.

To the kindness of Dr. Taylor I am indebted for the specimen upon the table, which was originally a solution of 8 grains acetate of morphia in half an ounce of distilled water. By accident, it had been set aside, and was lost sight of for several months. On examining it, the deposit and the change in color of the solution, mentioned before, were observed, and a single crystal reaching from the surface of the liquid diagonally through the solution to the bottom of the vial on the opposite side.

The gradual decomposition of acetic acid in crude vinegar is well known, and it is possible that the changes noticed above are of the same or a similar nature. At any rate it is very evident that acetic acid, in contact with organic bodies, is very liable to undergo decomposition, and since an organic body in such a condition is apt to predispose others, with which it may be in direct contact, to similar changes, it is a question of great moment whether the addition of acetic acid to our officinal fluid extracts of ergot and of ipecacuanha may not be more detrimental than useful.—*Amer. Journal of Pharmacy.*

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## COLLATED PRACTICAL RECEIPTS.

BY ALBERT E. EBERT.

*Borax and Glycerine.*

Take of Borate of Soda in fine powder, one part.
Glycerine, two parts.
Mix, perfume, and color with cochineal.

*Calendula Jelly.*—Homœopathic!

Take of Starch in powder, seventy grains.
Glycerine, one fluid ounce.

Mix the powdered starch with the glycerine, and gradually heat the mixture to about 240° Fahr., constantly stirring, and when cold add,
Saturated tincture of marigold flowers, one fluid drachm.
Tincture of cochineal,
Oil of rose, q. s. to color, and perfume.

### *Calendula Cerate.*

Take of Marigold flowers, bruised, one part.
Place into a porcelain dish and add boiling water, 2 parts.
Let it digest for several hours, and add butter, *fresh*, 6 parts.
Apply heat until all the water is dispersed, and strain through linen cloth with pressure.

Although the above is an authoritative formula for preparing this *innocent* external remedy, it will not, if prepared by this process, receive the endorsement of the disciples of *Hahnemann*, with whom it is a prominent remedy "*for all the ills that flesh is heir to*," for want of the characteristic yellow color; and as appearances are great aids to *strong faith*, we will add a formula for a cerate having the requisite color, and insuring simplicity and despatch in its preparation:

Take of Tincture of Marigold flowers (saturated), one part.
Lard (fresh), eight parts.
Heat on a water bath until all the spirit is dispersed, and a uniform preparation is obtained.

### *Sugared Calamus, or Candied Sweet-Flag Root.*

Take of Calamus Root (cut in small pieces), one part.
Macerate in four parts of water twelve hours.
Add sugar (crushed), twelve parts,
And with constant stirring dry it perfectly, by the aid of a gentle heat.

### *Medicated Prunes.*

Take of Senna leaves, two parts.
Boiling water, sixteen parts.
Macerate for an hour and strain; add to this infusion,
Prunes (stoned), thirty-two parts.
Sugar (crushed), ten parts.
Boil together, with constant stirring, for about ten minutes, and evaporate by means of a water bath, until reduced to a pulpy consistence; add to each pound of this confection,
Citric acid, in fine powder, one drachm.
Tincture of Ginger, one fluid ounce.
Mix.

### *Black Currant Lozenges.*

Take of Black Currants, dried, a sufficient quantity; add a small quantity of water, and soften by heating in a water-bath until reduced to a soft, pulpy mass, pass this through a hair sieve, and evaporate to the consistence of a paste.
Take of this Black Currant paste,
White Sugar, in fine powder, of each one pound.
Gum Arabic, in fine powder, two ounces.
Citric Acid, in fine powder, half an ounce.
Mix, and make into a mass with Raspberry syrup, q. s., and divide into lozenges of ten grains each.

*Species laxantes Saint Germain—St. Germain laxative powder.*

Take of Senna leaves, previously exhausted with strong Alcohol, and dried, sixteen parts.
Elder flowers, ten parts.
Fennel seed,
Anise seed, of each five parts.

Cut and well bruise them, mix together, and when dispensing add forty grains of Bitartrate of Potassa to each ounce of species.

*Castillion's Powder.*

Take of Tragacanth,
Sago,
Salep,
Sugar, of each, in very fine powder, four parts.
Carbonate of Lime (precipitated), one part.
Cochineal q. s. to color.

Mix them thoroughly, and pass through a fine sieve.

*Composition Powder.*

Take of Bayberry Bark, in very fine powder, sixteen parts.
Ginger, in very fine powder, eight parts.
Cayenne Pepper, in very fine powder,
Cloves, in very fine powder,
Cinnamon, in very fine powder, of each one part.

Mix, and pass through a fine sieve.

*Condition Powder.*

Take of Fenugreek, in powder, sixteen parts.
Sulphur, in powder, eight parts.
Cream Tartar,
Liquorice Root, in powder,
Nitrate of Potassa, in powder, of each four parts.
Black Sulphuret of Antimony, in powder, two parts.
Gentian Root, in powder,
Anise Seed, in powder.
Common Salt, in powder, of each one part.

Mix.

—A correspondent, asks us for a formula for "Granular Citrate of Magnesia." The so-called "Granular Citrates of Magnesia," we consider frauds, inasmuch as all samples thus far examined by us have not contained a trace of magnesia, but were simply mixtures of tartaric acid, bicarbonate of soda and sugar, flavored with some esssential oil or essence. During our sojourn in Germany, we were shown a specimen of a soluble granular salt, the factor of which gave us the following process for its manufacture. As we do not possess the *elan* of factors of "scientific specialties," we have never given the process a trial, but hope our querist will do so, and give the results of his experience in the pages of our journal. By this means practical knowledge may be diffused, and, at the same time, a blow will be struck at illegitimate pharmacy. With the assistance of our readers we will do what we can to expose the quackery which these unscrupulous humbugs wish to hide, by styling their nostrums "Scientific Pharmaceutical Specialties:"

Take of Citric Acid, eight parts,
Carbonate of Magnesia, five parts,
Water, boiling, one part.

Place the powdered carbonate of magnesia into a suitable vessel and heat uniformly from 200° to 300° Fahr. Into a shallow porcelain dish, of sufficient capacity to hold the mixture of citric acid and magnesia, place the citric acid previously reduced to a fine powder, and add the boiling water. Place over fire and heat until the citric acid is in perfect solution; now stir in the magnesia and mix thoroughly; while the effervescence is going on, remove the mass from the dish and form it with the hands into a ball, keeping it in this manner and form until a firm outer surface has been formed. Then desiccate all moisture by the aid of gentle heat, and when dry rub it into a fine powder.

### *Syrup of the Phosphates of Iron, Quinia and Strychnia.*

At the request of a correspondent for a formula for the above-named syrup, we give the following, which is that employed by Drs. Aitken and Lyons, with some slight modifications in the manipulation, suggested by Charles Bullock in the *American Journal of Pharmacy*, May, 1867:

Take of Phosphate of Soda, ℥ i.;
Sulphate of Iron, ʒ v.;
Sulphate of Quinia, 192 grains;
Acid Sulph., diluted, q. s.;
Water of Ammonia, q. s.;
Strychnia, 6 grains;
Acid Phosph., diluted, ℥ xiv.;
White Sugar, ℥ xiv.

Dissolve the iron and soda salts each in four fluid ounces of warm water; mix the solutions; collect the precipitate on a paper filter, and wash with warm water; remove the filter from the funnel, and press carefully between folds of bibulous paper until no more water is absorbed by dry paper.

Having dissolved the sulph. quinia in four ounces of water, by careful addition of diluted sulphuric acid, add a weak solution of ammonia, stirring constantly until a slight excess is added. Collect the precipitated quinia on a paper filter, and proceed as with the iron salt. Both these precipitates will readily detach themselves from the wet filter, without loss, if the pressing is carefully done.

Dissolve the strychnia and quinia in ℥ viii. of the phosphoric acid, and the iron salt in the remainder of the acid; mix the solutions; filter and add the sugar.

It is preferable to dissolve the sugar in the unfiltered liquid, and then to filter the syrup. The dose of the preparation is one teaspoonful.

# NEW REMEDIES.

The following extracts from a recent lecture by Dr. B. W. Richardson will probably be of interest to pharmacists :—

*Nitrite of Amyl.*—The physiological action of nitrite of amyl is directly exerted on the ganglionic nervous tract; it paralyses so that the nervous supply over the extreme vascular system is impaired; if the effect be sustained, the muscular system generally is thrown into relaxation. The observation of this effect of the nitrite has led Dr. Richardson to suggest it primarily as a remedy for excessive spasmodic action,—for tetanus specially,—and it has been applied in that direction with much success. Lately, Mr. Foster, of Huntingdon, has administered the nitrite with complete success in a case of traumatic tetanus,—holding the convulsions in check for the long period of nine days. The nitrite is best administered by inhalation, five minims on a piece of folded linen or handkerchief being the dose for an adult. It will act if given by the mouth; but as the action is very energetic, and requires to be kept under the control of the administrator, it is much safer administered by inhalation. In tetanus, the periods of recurrence of the spasmodic attacks should be carefully watched, and, when the paroxysm is threatened, the inhalation of the nitrite should commence, so as to subdue the spasmodic seizure. The agent has been administered also with success in spasmodic angina, asthma and colic.

The action of the nitrite is curative only in so far as it controls the spasm,—that is to say, it prevents death, and so leaves time for recovery. Dr. Richardson has observed that frogs under strychnine tetanus are immediately relieved of spasm by nitrite of amyl, and that with great care in keeping the animals free of spasm, they can be sustained until the strychnine is removed from the body, when there is recovery; in this explanation he defines the true place of the nitrite as a remedy. In tetanus the administration of the nitrite is not to be considered as displacing other rational means of cure. On the contrary, it favors other means; it enables food to be freely supplied, it gives time for the action of purgatives and diureties, or for the employment of the hot air bath.

*Caustic Ethylates.*—The ethylates are crystalline substances, in which one atom of hydrogen of absolute alcohol is substituted by one of potassium or of sodium. Brought into contact with the body, the ethylates at first produce no action, but as they pick up water from the tissues they are decomposed, the potassium or sodium is oxidized, yielding caustic potassa or soda in the fresh state, while alcohol is re-formed from the re-combination of hydrogen derived from the water. Dr. Richardson proposes the employment of these ethylates as caustics. He believes they will be found to be the most effective and manageable of all caustics; and that in cases of cancer, when it is desirable to destroy structure without resorting to the knife, and in cases of nævus and other simple growths, they will be of essential service. The ethylates can be held in solution with alcohol in various degrees of strength; the solution can be applied with a glass brush or injected by the needle, and a slow or quick effect can be ensured, according to the wish of the operator. The ethylate of potassium is the most active agent.

*Triethylic Ether.*—When the ethylate of sodium is acted upon by chloroform, the chemical action which takes place is very fierce, and great care is required to secure a fair product. The chlorine of the chloroform combines with the sodium of the ethylate to form chloride of sodium, and triethylic ether remains. As chloroform contains three atoms of chlorine, each single part of chloroform decomposes three parts of ethylate of sodium. Thus:—3 ($C_2 H_5 NaO$), ethylate of sodium; $C H Cl_3$, chloroform = 3 $Na Cl$, chloride of sodium, and $C_7 H_{16} O_3$, triethylic ether.

The ether is a heavy, aromatic, etherial fluid, having a vapor density of 74, a specific gravity of ·896, and a boiling-point of 145° C., 297° F. It acts much like alcohol physiologically. Dr. Richardson has lately used it as a menstruum of ethylic ether for general anæsthesia. The ethylic ether carries over with it, in evaporation, sufficient of the heavier ether to form a compound vapor which is very pleasant to breathe and equable in action. He has administered this compound twice for operations on the eye,—once while Mr. Brudenell Carter operated for strabisimus, and once while Mr. Walker, of Liverpool, operated for cataract. The anæsthesia in both cases was perfect. The ether also forms an excellent mixture with bichloride of methylene; and if mixtures of anæsthetic substances were satisfactory scientific applications, it might be brought into extensive use. Dr. Richardson accepts it, however, rather as an index of the way than of a resting-place. He looks for a simple ether which shall have the full and safe qualities of the mixture, together with perfect stability. There is, in truth, already another ether, called trimethylic, made by acting on methylate of sodium, $C H_3 NaO$, with chloroform; the product being 3 ($Na Cl$), common salt, and $C_4 H_{10} O_3$, trimethylic ether. But this ether, which has a vapor density of 53, and a high boiling-point, is not quite, though it approaches, the substance required.—*Pharmaceutical Journal, London.*

## ON SULPHOCARBOLIC ACID AND SULPHO-CARBOLATES.

BY J. CREUSE—OF BROOKLYN, N. Y.

Sulphocarbolic acid and its compounds are attracting more and more attention; they are noticed in all medical and pharmaceutical publications. It is to be regretted while processes for their preparation multiply, and so many have new ones to propose, that nobody should attempt to enlighten us on their chemical composition, and that our knowledge of them should remain so incomplete.

For example, all the writers almost take for granted that, in analogy with sulphovinic acid, sulphocarbolic acid consists of two equivalents of sulphuric acid and one equivalent of carbolic acid. In all cases, every one takes also for granted that, to effect the combination, it is only necessary to mix the two acids in that proportion and apply a moderate heat.

My intention is to prove that, 1st, sulphocarbolic acid is composed of three equivalents of sulphuric acid and one of carbolic acid; 2d, to combine carbolic and sulphuric acids, without waste of carbolic acid, it is necessary to take six equivalents of the latter and one of the former; 3d, sulphocarbolates are composed of two equivalents of the acid and three of the base.

The process of examination I employed is simple enough: it consists in heating together various proportions of the two acids, and by means of carbonate of baryta determining what quantity of sulphuric acid is converted into sulphocarbolic acid, what proportion of it remains free, and how much carbonate of baryta is transformed into the sulphocarbolate of the same base.

This is effected in this wise: Known weights of carbolic and sulphuric acids are mixed together, heated, and when cool diluted with water. To this a certain weight of carbonate baryta, always in excess, is added, and the liquid brought to ebullition, so as to avoid the formation of bicarbonate of baryta. The mixture is then poured on a filter, and the filter well washed with water; the filtrate, which I will call liquor *a*, is kept aside. The filter is then washed, first with dilute muriatic acid, and then q. s. water, the washings being kept aside, and called liquor *b*. This done, the filter is dried and the weight of the precipitate taken, which I will call precipitate *c*.

Then liquors *a* and *b* are treated by an excess of sulphuric acid, and the weights of the precipitates ascertained. I will call them respectively precipitate *a* and *b*.

These three precipitates, *a*, *b* and *c*, consist of sulphate baryta, but each of them has a different meaning.

Thus, precipitate *a* indicates what quantity of the carbonate baryta has been transformed into sulphocarbolate.

Precipitate *b* shows how much of the carbonate baryta was in excess.

Precipitate *c* tells us what proportion of the sulphuric acid remained uncombined in the mixture.

A few words about the *modus operandi* may not be unnecessary: for ascertaining the weight of the precipitates, I cut two filters from the same sheet of paper, trim them precisely to the same weight, and fold them together. The precipitate is collected on the inner filter, both filters are washed together by the same reagents, and dried together. The difference in weights gives quite accurately the actual weight of the precipitate.

By this process I have examined successively mixtures of one eqivalent of carbolic acid with one, two, four, five, six and eight equivalents of sulphuric acid.

From the first to the fifth mixture, I remarked that precipitate *a* kept steadily increasing in proportion, and remained stationary afterwards. I noticed also that all mixtures containing less than six equivalents of sulphuric to one of carbolic acid had more or less of a carbolic smell, while in this last all odor had completely disappeared. From these two facts, I think I can safely conclude that it requires six equivalents of sulphuric acid to transform completely one equivalent of carbolic acid into sulphocarbolic acid.

Not wishing to make this communication too lengthy, I shall describe here only the examination of the 1st, 2nd and 5th mixtures, the most important.

The first, proposed by Mr. T. Omar Guy, was composed of one equivalent of carbolic acid, and less than one equivalent of sulphuric acid, or in weight 94 grains of the former and 49 of the latter; it gave for 100 grains when treated by 35 grains carbonate baryta:

| | |
|---|---|
| Precipitate *a*, | 37 grs. |
| “ *b*, | 1 “ |
| “ *c*, | 1½ “ |

The second, viz., one equivalent carbolic acid and two equivalents sulphuric acid, or in weight 94 grs. carbolic, 98 grs. sulphuric acid, gave for 100 grains, after saturation by 50 grs. carbonate baryta:

| | |
|---|---|
| Precipitate *a*, | 49 grs. |
| “ *b*, | 2 “ |
| “ *c*, | 9 “ |

The fifth, containing one equivalent of carbolic acid and six of sulphuric acid, or in weight 188 grs. carbolic acid and 607 grs. sulphuric acid, 79 p. c. was made without heat. After two hours contact the mixture presented no carbolic smell whatever.

One hundred grains of it were treated by 140 grs. carbonate baryta, and gave:

| | |
|---|---|
| Precipitate *a*, | 41 grs. |
| “ *b*, | 32 “ |
| “ *c*, | 92 “ |

As I remarked before, this is the proportion in which the two acids are to be mixed, in order to transform all the carbolic acid into sulphocarbolic acid.

The weight of the three different precipitates will also teach us the composition of both sulphocarbolic acid and sulphocarbolate of baryta.

Thus, 100 grains of the mixture contained 76.35 grs. of sulphuric acid, 79 p. c. or 60.31 grs. of anhydrous sulphuric acid, and 23.65 grs. of carbolic acid.

Of these 60.31 grs. of sulphuric acid, 31.64 grs. remained free, as shown by the 92 grs. of sulphate of baryta (precipitate *c*), formed by it. Thence, the balance, 28.67 grs., was combined with 23.65 grs. of carbolic acid, forming a certain amount of sulphocarbolic acid, which saturated 27.22 grs. of baryta, as shown by the 41 grs. of sulphate baryta precipitated by an excess of sulphuric acid (precipitate *a*).

We have then for the composition of sulphocarbolate of baryta the following proportions:

| | |
|---|---|
| Sulphuric acid, | 28.67 grs. |
| Carbolic “ | 23.65 “ |
| Baryta, | 27.22 “ |

Dividing these numbers by the respective equivalents of the chemicals they represent we obtain:

| | | | |
|---|---|---|---|
| Sulphuric acid, | 7-16 | or, in round numbers | 6 equiv. |
| Carbolic “ | 2.48 | | 2 “ |
| Baryta, | 3.54 | | 3 “ |

This does not evaluate the equivalent or equivalents of water, but is a sure guide for the preparation of sulphocarbolic acid and the sulphocarbolates.

### *Preparation of Sulphocarbolic Acid.*

This is the process I should recommend to prepare pure sulphocarbolic acid.

| | |
|---|---|
| Carbolic acid (Calvert's No. 1), - - | 188 grs. |
| Sulphuric acid, pure, 79 p. c., - - - | 607 " |
| Carbonate baryta, - - - | q. s., or 636 " |

Melt the carbolic acid, add to it the sulphuric acid by small portions, and let stand in a warm place till all smell of carbolic acid has disappeared. Dilute the liquid with eight times its volume of water, add the carbonate baryta, bring to ebullition and filter. The filtrate should give no precipitate with either sulphuric acid or nitrate baryta.

As sulphuric acid is of variable strength, and the quantity of carbonate of baryta is intended only to accurately saturate and remove the free sulphuric acid, it may be necessary to add to the filtrate a little carbonate baryta or sulphuric acid, till it answers the requisite test. The liquid should be then evaporated at a gentle heat, away from the influence of light, and allowed to crystallize.

Pure sulphocarbolic acid is colorless, has no smell, dissolves in water, alcohol and ether, in all proportions; it does not seem to possess any antiseptic properties, for its watery solution becomes mouldy in forty-eight hours when the weather is warm. Nitric acid, especially with the help of heat, decomposes it, forming, among other compounds, picric and sulphuric acids.

### *Sulphocarbolate of Soda.*

This salt may be prepared by saturating sulphocarbolic acid by carbonate of soda. By evaporation, abundant crystals are obtained without difficulty.

Sulphocarbolate of soda is inodorous, almost colorless; it is reddened by exposure to direct sunlight. The shape of its crystals is very much like that of sulphate of zinc. It is neither efflorescent nor deliquescent.* It dissolves readily in water, less so in alcohol, not at all in ether. Nitrate of baryta causes no precipitate in its solution. Sulphocarbolate of soda cannot be kept in weak solution without turning mouldy in warm weather. It is decomposed by nitric acid into sulphate soda, free sulphuric and picric acids, etc.

### *Sulphocarbolate of Zinc.*

Is obtained by saturating sulphocarbolic acid with a slight excess of carbonate or oxide of zinc recently precipitated. It crystallizes easily, in the shape of flattened prisms. It has no smell, no color, or hardly any, and tastes very much like sulphate of zinc. It is soluble in water and in alcohol. It is not precipitated by salts of baryta. Direct sunlight affects it much more than the corresponding salt of soda, so that it is more difficult to obtain colorless. It is decomposed by nitric acid in the same manner as sulphocarbolate of soda. Its solutions turn mouldy in warm weather, unless they are concentrated.

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* It tastes like sulphate of soda; slightly bitter and salty, but not acrid.

The other sulphocarbolates may be prepared in the same manner, should any be required.

Though the above experiments show that *pure* sulphocarbolates have no antiseptic power on inert matter, it does not prove at all that they are useless where the human body is concerned. On the contrary, facts tend to show that in the economy carbolic acid is freed from its combination, and that sulphocarbolates are valuable compounds to administer when the effects of carbolic acid are desired, without its caustic properties.

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## ON FERMENTATION.

BY PROFESSOR A. W. WILLIAMSON, F.R.S.

*Before the Society of Arts. Reprinted from the Pharmaceutical Journal, London.*

### LECTURE I.—CONTINUED.

Now, the question arises whether this formation of acetic acid ought to be classed, as I am at present classing it, amongst the processes of fermentation. If it is due to the absorption of oxygen, you might naturally inquire whether one ought not to place it amongst the common processes of combustion, and it is right that I should state that by some authorities it is at present so classed. My reason, however, for stating what I have done, that it is a process of fermentation, is this, that it is usually effected by the action of a peculiar organism, called a vinegar-plant, an organism which I shall have occasion to show you hereafter, which does exert in that particular process the function of taking up oxygen from the air, and of inducing the alcohol to combine with it. There are many other processes by which we could get it, but the actual process by which we do get it is a process in which this vital organism, the vinegar-plant, is the agent of its formation. It might be made by mere processes of combustion, but it is made by a process of fermentation.

There is one singular feature in the first and best known of these processes—the alcoholic fermentation—which you will notice when I tell you something of the way in which the processes of fermentation present themselves, even without very great care on the part of the observer. If, for instance, you were to express the juice of some sweet fruit—say grapes—and if you were to leave that expressed juice in contact with the air for a little time, having first squeezed it through some suitable cloth or filter, so as to have it clear, of course there would be no solid particles in it when you put it aside; but, if you leave that in a tolerably warm place, in contact with the air, you would find that little solid particles would appear in this juice, that they increase in number, and that, in proportion as they increase in number, and as the quantity of them becomes greater, so does the process of effervescence —the evolution of gas from the grape juice—become more and more rapid. These little solid particles, which are not present at first in the grape juice, but which gradually make their appearance when it is exposed to the air, are what we commonly call, in the ordinary case of alcoholic fermentation, in this country, yeast—either beer-yeast or wine-yeast; it is the same organism in each case. The peculiarity of the process is this, that these substances—this yeast—which seems to make the sugar into those products which I enumerated to you, does not disappear while doing the work, but is produced by the very process. The more active the production of these yeast-cells, and the more speedy the growth of these yeast-cells, the more effective and rapid is the process of fermentation, and no fermentation of the kind of which I am speaking of at present—the alcoholic fermentation—has ever been known to take place in the absence of these organisms.

That circumstance I just mention briefly at present, but the fact that these yeast-cells appear whenever the process is going on—and the more they grow the more rapid is the fermentation—has led people to suppose at first, and to believe afterwards, that these yeast-cells were the agents of the transformation, the active substances which decomposed the sugar in contact with the water, and induced the transformation which we noticed. Now, the very fact that one of the two substances which are reacting upon one another chemically (because the changes are chemical in their fundamental nature), should not disappear, but should rather increase by the process, is entirely anomalous—it is entirely at variance with the simplest and best known facts of chemistry, so much so, that if it were not established upon incontrovertible evidence, I believe that most chemists would be inclined to disbelieve it, and to say it cannot be,—it is impossible,—it is a mistake. If you tell me, as a chemist, that this yeast is transforming sugar by its action on the sugar, and that instead of being consumed the yeast is actually increased in quantity by doing that work, I should say it is nonsense—it cannot be, because in all the cases of chemical action which I know best, nothing of the kind occurs, but the very opposite. When one substance acts upon another, each one disappears in the process, and is transformed into a product having other properties. I need hardly give you illustrations of that; but one or two simple cases may not be useless, as serving to fix clearly this important circumstance in your minds.

I will take at first one of a particularly elementary and simple kind,—a process of combustion. I will take a little strip of metal—magnesium wire—and will hold it for a short time in the flame of spirit lamp, so as to raise it to a sufficiently high temperature. The light you see emitted is due to the combustion of the oxygen in the air with the metal magnesium, which I hold in my hand. This is one of the simplest possible cases of chemical action. The metal has disappeared. The strip of wire is gone, and oxygen from the air disappeared also. At the same time a white powder was formed. I dare say you did not notice it, but here is a quantity of the same substance in a bottle. It consists of oxygen from the air combined with the metal magnesium, and the point is this—that all the magnesium which took part in that process disappeared, and went to form this white powder, and all the oxygen which took part in the process also disappeared. The two united together, each disappeared as such and went to form this new product. And, moreover, we can tell, from the examination of the proportions in which the substances combine, exactly what weight of oxygen would disappear for every part by weight of magnesium. If you burn, for instance, three grammes or three pounds of magnesium, you would require exactly two grammes or two pounds of oxygen. For instance, three pounds weight of magnesium would combine with two pounds weight of oxygen, and the product of the two together would be five pounds in weight. I may show you the same thing with soda, not the substance which is commonly called by that name, which is a carbonate of that base. I have here a little pure soda solution in a bottle. I will pour some into a beaker-glass, and I will show you one property which characterizes it, viz: that of changing the color of this red paper into blue. Now, I will pour some of this acid body, the oil of vitriol, into another beaker-glass. If I put the paper which has been discolored into this pure acid it would be dissolved; but I will dilute some of it with water, and then you will see that paper, which has been rendered blue by the agency I have just used, is brought back again to red by the agency of this acid. Now, if I mix the acid with the soda, we shall have audible evidence of violent action going on. I will not go on with the process, but I have purposely taken the two substances in presence of very little water, in order to show you that the heat evolved makes the liquid boil with great violence. I could have avoided that by adding water in the first place, but I wished to show you the vigor with which they unite together. If I were to go on adding acid to the soda, little by little, feeling my way until I had just completed the action, I should have got some water formed and some of the beautiful salt which I have here,—a body which is neither soda nor acid; it is a salt called Glauber salt or sodic sulphate, and all my materials would have disappeared in the process. If I use them in proper proportions, all the acid and soda would disappear and go to form these two other products. I might dissolve some of this sulphate in water, and might put red paper or blue into it and it would not affect either of them; it is perfectly neutral in that respect. The proportion by weight in which this combination takes place is this: If I add 40 parts by weight of soda, and 49 of oil of vitriol in a state of purity, I should have as the result, 18 parts by weight of water, and 71 of sodic sulphate, and if I add together the weight of my materials and the weight of my products, I get the same—89. Nothing disappears in the process; all the acid and all the base which takes part in it is employed. Each particle which took part in the process disappeared as such, and it passed over into another form.

I will mention one other case, because it is somewhat more complex. I may take the case which I was showing you just now, the white marble and hydric chloride or muriatic acid, which I used for making the carbonic acid gas. In that case, I used two materials, carbonate of lime, as it is commonly called, and hydrochloric acid. We get three products; on the one hand is a salt, which is commonly called chloride of calcium, a solid substance used for drying gases, as it has a great affinity for water; another is water; and the third, as I showed you, carbonic acid gas. There, again, we have precisely the same thing.

All the marble, and all the hydric chloride which takes part in the formation of those three products disappeared as such, and they resolved themselves into other compounds possessing different properties; but the weight of the products is equal to the weight of the materials. That rule holds good throughout all ordinary cases of chemical action.

On the other hand, in fermentation it is not so; one of the active substances is formed, and the more active the fermentation, the more does it grow. In fact, if you want to get yeast, you must go to a place where the breaking up of sugar into alcohol and carbonic acid is going on; or if it is in the south, you must go to where wine is being made, you go to a wine-maker, and get the yeast from him. The only way of getting yeast is from that process of fermentation which sets in spontaneously under the conditions I named to you.

I ought, however, in justice to the wonderful process which I alluded to, to give you two or three other particulars regarding it. I showed that sugar is broken up by the ferment into these products, but no case is known of pure sugar—and when I say pure sugar, I mean sugar in the purest form in which we have it—being decomposed by yeast. If you were to put some ready-made yeast—thriving, growing yeast—into a solution of chemically pure sugar, some of your yeast would decompose, some of it would resolve itself into other products, and other parts of it would be absorbing those products which are present in the liquid, and whenever the process is to be carried on advantageously and rapidly, it is customary to add some saccharine liquid—some other substance capable of nourishing the yeast. When I want good fermentation I do not take water to dissolve my sugar and put yeast into it, but I boil some of this malt, which is one of the best materials for the purpose, in water, and take a decoction of malt or decoction of yeast and put the sugar into it. In such a liquid there are several bodies which we know; and I may safely say that there are a great many others which we do not know, and there is no doubt that their presence is of considerable importance to the chemical change which takes place. There are substances which I shall presently have occasion to show you, and to speak of, formed by the germination of the grain, by the formation of the malt, which are related somewhat to this body which I have here. This was some pure wheat flour—every kind of flour would not do—and it is supposed that some people mix other materials with flour. It was kneaded up with water, pressed together, and, whilst the pressure was being continued, water was allowed to trickle over it. I have in another bottle some of the water that flowed over it. There is a white substance deposited from this water, which is commonly known and much used, by the name of starch, and starch is, in its chemical composition, first cousin to sugar; it is a substance which passes over very readily into a kind of sugar by a process I shall presently have occasion to allude to. But the little ball of flour while being kneaded had the starch washed away from it, and I have left, as the result, a substance which is commonly known by the name of gluten. If I were to describe it in chemical language, I should say it is something like flesh, or the muscular fibre of animals, for, in chemical composition, it approaches very nearly to that. When barley is malted, and kept in a warm place for some time, the grains begin to germinate and decompose, and some bodies are formed from this gluten, which is partially broken up. The malt contains also some sugar made from that starch—grape sugar, as we usually call it.

If we only had these extreme cases, I really do not know what we should do. If we had in our science one set of bodies which appeared so constantly to act at variance with the general laws which the others obey, I think we could not call chemistry a science. I have taken two or three examples to show you the definite proportions which we find to regulate the ordinary process of combination. I might have taken thousands, but the point is that this law does not appear to apply at all to these chemical changes which we call fermentation. One of the active substances in fermentation is being formed, it is increasing, not disappearing at all, and the contradiction is so strong and manifest that the only way out of the difficulty will be to do something of the kind which I was speaking of some time ago, that is to say, see if we cannot get some intermediate facts which will serve to connect the extreme ones; to see if we cannot get at first something between the two classes, and then try to get some further links between them. There are processes of chemical change—I will not call them processes of fermentation, for I do not know whether they are, but which are analogous to it, and some of them are very interesting and very beautiful. I have here a substance called amygdalin, made from bitter almonds. It is a bitter-tasting substance, and consists of four elements which it is not necessary that I should name. In this other bottle I have a paste formed of sweet almonds, which have been crushed with a pestle and mortar, and I will put some of it into the warm distilled water in this flask. Into the mixture I will put some of this amygdalin. If I were to leave it without that addition, there would be very little change; the substance would gradually subside, but there would be no product given off in the way you will presently see. After letting it stand for a few minutes, I will pour some of the mixture into an open vessel, and we shall be able, without difficulty, to perceive a fragrant smell, which is due to the presence of a liquid of which I have a quantity here, a substance known by the name of oil bitter almonds. If I were to perform the same experiment on a large scale, and macerate some of this amygdalin with almond paste, put them together with warm water, distil the mixture and collect what comes over, we should find that water would pass over and with it would be a few drops of oil of bitter almonds, and the amygdalin would be decomposed in the process. There is in the sweet almond paste a substance which I cannot describe in better terms than by comparing it to that gluten which I showed you just now. It is very similar to it in its composition, and by the contact of this, the synaptase, as it is called, with the amygdalin, the elements of the amygdalin are broken up into several products; one of them is the oil of bitter almonds, another is prussic acid, which generally accompanies the oil, the third is a variety of sugar, of the kind which is called grape-sugar, and there is probably also some formic acid. Here we have the breaking-up of a complex body—amygdalin—into several simpler bodies by the action of the body called synaptase; but there is not in the process, as far as I know, any living organism at work. There is a substance which is somewhat similar to these living organisms, but there is no organized structure, as far as our knowledge goes at present.

(*To be continued.*)

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## EDITORIAL GLEANINGS.

NEW SOURCE OF CITRIC ACID.—Prof. O. Silvester, of the Catanian University, has recently discovered that the fruit of *Cyphomandra betacea* contains large quantities of citric acid. The plant belongs to the *Solanaceæ*, and it occurs here and there in gardens throughout Sicily. It is a native of Mexico; is frequent in Peru and other parts of South America, where it is called *Tomate de la Pax*. The fruit contains from 1 to 1.5 per cent. of pure citric acid.—*Pharm. Journal, London, from Cosmos.*

MODIFICATION OF BONES BY EARTHS IN THE FOOD.—M. Papillon has recently communicated to the Academy of Sciences, in Paris, some interesting results of experiments, in which pigeons and rats had various earthly salts mixed with their food. After continuing this for several months the animals showed no signs of being affected. On examination of their bones, it was found that considerable quantities of strontia and alumina had been accumulated in them, according as their food had been mixed with a salt of strontia or alumina.—*Ibid.*

STYPTIC COTTON.—Dr. Ehrle, of Isny, recommends cotton impregnated with sesqui-chloride of iron, as a valuable article for stopping hemorrhage. It is prepared by first cleansing the cotton, by boiling in a weak solution of soda (4 per cent.) for an hour, washing and drying, after which it is steeped in a strong solution of sesqui-chloride of iron, and dried in the air, without exposure to sun or artificial heat.—*Dublin Journal of Medical Science.*

CHEAP METHOD OF PRODUCING HYDROGEN.—M. M. Tessie du Mothay and Marechal, who proposed the preparation of oxygen for illuminating purposes, &c., from the manganate of soda, have discovered a cheap and practical means of obtaining hydrogen in immense quantities, depending upon the decomposition of water by carbon and heat. When alkaline or earthly hydrates, as the hydrates of potassa, soda, lime, &c., are mixed with charcoal, coke, &c., and heated to a red heat, the water of hydration is decomposed, giving off carbonic acid and hydrogen gasses, thus:—$2\,Ca\,O, HO + C = 2\,Ca\,O + CO_2 + H_2$. The $CO_2$ can be removed by suitable absorbants. The hydrates can be used indefinitely in this process, provided the residues are moistened each time with water, so as to reproduce the original hydrates.—*Journal of the Society of Arts.*

OIL OF PEPPERMINT AS A LOCAL ANÆSTHETIC.—Dr. Alfred Wright, writing to the *Lancet*, says, that a few years ago, when in China, he became acquainted with the fact that the natives, when suffering from facial neuralgia, applied oil of peppermint to the seat of pain with a camel-hair pencil. Since then, in his own practice, he has frequently employed oil of peppermint as a local anæsthetic, not only in neuralgia, but also in gout, with remarkably good results. He has found the relief from pain to be almost instantaneous.—*Pharm. Journal, London.*

CIDER TREATED WITH SULPHITE OF LIME.—Within a few years sulphite of lime has been used at the moment of fermentation of wine and cider, in order to prevent them from becoming sour. The wine or cider thus treated soon becomes clear and of an agreeable taste. Those whc drink it, however, after a short time complain of pains in the stomach, loss of appètite, &c. This is natural, and may be thus explained: A certain quantity of lime is dissolved by the wine or cider, and in a noticeable quantity. Analysis recently made have yielded about 30 centigrammes (4.6 grains) of sulphate of lime in a pint of cider.—*Journal of Applied Chemistry.*

SULPHUROUS ACID.—The value of sulphurous acid has been established by many, and crucial, experiments, and is generally admitted. This agent is specially recommended by medical officers of health. There is a want of convenient methods of applying it, and especially of applying it in a limited space, and to a definite and measured degree. Mr. John Gamgee has called attention to the convenience of employing it as disengaged from an alcoholic solution. Cold alcohol will, he states, take up three hundred times its bulk of sulphurous acid gas; and where, for example, it is desired to saturate a box of clothing with this gas, it is sufficient to drop a certain quantity of its saturated alcoholic solution upon the floor of the box, and a large and definite quantity is set free by evaporation. The suggestion is one of importance, and seems to us worthy of attention. The solution of sulphurous acid in alcohol could easily, and probably with advantage, become a general article of pharmaceutial commerce, for medical and sanitary use.—*British Med. Journal.*

APOMORPHIA, THE NEW EMETIC.—Apomorphia is obtained by digesting morphia in concentrated hydrochloric acid, at a high temperature, for several hours. It differs, chemically, from morphia, in containing an equivalent less of hydrogen and oxygen, or the elements of water. It is the most speedy and certain emetic known, and its action is not accompanied or followed by any baneful effects. The tenth of a grain of the hydrochlorate of apomorphia, or evèn less, is the dose required. It may be given with safety to children, and it acts more rapidly when hypodermically administered.—*Journal of Applied Chemistry.*

SIMPLE METHOD OF PREPARING OXYGEN.—M. F. C. Calvert has suggested a means of preparing oxygen in large quantities, and with great facility, consisting in the reaction occurring between a solution of hypochlorite of lime and sulphate of ammonia. For example, he employs 200 cubic centimetres of a solution of hypochlorite of lime, containing 5.14 grammes of hypochlorous acid, to which he adds 1.146 grammes of sulphate of ammonia dried at 220°. The oxygen is at once evolved, even in the cold; but to obtain the entire quantity it is necessary to apply heat towards the close of the process. The mixture, in the quantities indicated, furnishes, within an hour, 192 c. c. of oxygen, the theoretical quantity being 194 c. c.

BLOOD PICTURES.—Dr. Day, of Geelong, Australia, the improver of the guaiacum-tests for blood and other animal fluids, confirms the discovery of Neumann, that the picture or network formed by human blood, can be distinguished under the microscope from that which is formed by the blood of other animals. He says he has repeated the experiment, which is "wonderfully simple," almost every day for the last two months, with invariable success. A small drop, not a mere speck, of the blood is to be placed on a microscopic slide, and carefully watched, at a temperature of 10° or 12° Reaumm (=54.2° to 59° Fahr.), until the picture or network formed by its coagulation is developed. Human blood speedily breaks up into a "small pattern" network; the blood of other animals (calves, pigs, etc.,) takes a longer time, and makes a larger pattern,—but the blood of every animal seems to form a characteristic "picture." Dr. Day has examined the blood of calves, pigs, sheep, rabbits, ducks, hens, several kinds of fishes, etc., as well as that of man, and has found the results to be trustworthy and constant.—*British Medical Journal.*

THE VIRTUE OF THE SUNFLOWER.—Mr. Martin, in a paper by him to the Societe Therapentique de France, affirms that the common sunflower, extensively cultivated, has the effect of neutralizing the unwholesome vapors which are so fatal to health and life in marshy districts. The Dutch, who live only by dyking and draining their low lands, and are therefore good authority, pronounce sunflower culture a specific for intermittent fever,—the scourge of Holland. They assert that it has disappeared from every district when the experiment has been tried. It is not yet known whether this is the result of its rapid growth producing oxygen, or whether it emits ozone and destroys those germs, animal and vegetable, which produce that miasma which brings fever in its train.—*Ibid.*

## EDITORIAL.

### PHARMACEUTICAL EDUCATION.

It is gratifying to note the agitation now in progress in various parts of our country, in reference to the enactment of laws regulating the practice of pharmacy and the sale of poisons. Agitation must needs precede reform, hence, though legislative action has been effected in but few instances, there is cause for some degree of satisfaction.

In Rhode Island laws are now in force, which in the main are very acceptable, being based upon the draft recommended by the American Pharmaceutical Association. The State of New York also has upon its statutes certain regulations bearing on the subject, but these, so far, have not been enforced. The Pharmacists of Baltimore, by a united effort, have secured the passage of laws by the legislature of Maryland,—limited, however, in their application to their own city; so satisfactory have these proved that Wilmington and other places are petitioning for the same regulations within their own municipalities.

We have expected some action on the part of our State legislature upon this important subject, but the present session is drawing to a close without the accomplishment of anything of consequence.

In this city the Board of Health has made an abortive effort to limit the sale of poisons, and otherwise regulate the traffic in medicines; but the power to make such laws, or, rather, laws which can at all limit or regulate the general practice of pharmacy to those persons who are duly qualified for it, belongs to the State Legislature, and their aid must be evoked. It is now too late in the session to hope for any general laws upon this subject, but there is still time in which to accomplish something within our own city. We are pleased to know that a movement is now on foot, enlisting the interest and energy of most of our city druggists, to draft a law applicable to the city of Chicago, and press it upon the attention of our lawmakers without delay. In our next issue we hope to chronicle the action of our city pharmaceutists, and meantime wish them every success in their praiseworthy effort.

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A bill has been framed by the legislature of Illinois, in reference to the vending of patent medicines, requiring that a statement of the ingredients of such preparations be filed in the office of the clerk of each county in which they are sold, but it is not likely that it will be enforced even if passed, and in any event it would be but a partial protection to the purchaser. A much better provision would be to require the formula to be plainly printed upon each bottle or package offered for sale, and to provide a severe punishment for those who do not prepare their nostrums in strict accordance with the printed formula.

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## PROFESSIONAL QUACKERY.

It is a lamentable fact that no sooner does an adventurer embark in the sea of proprietary medicines, than he is able to find some professional man willing to testify to the wonderful virtues of the nostrum which he hopes to palm off on a too credulous public. Not only do we see the names of chemists in this connection, but those of physicians also. The burden of such certificates is to the effect that such and such a compound is calculated to fulfil certain indications, or that it is free from "mineral poisons, or deleterious ingredients,"—certificates which may be literally true as far as they go, but which too often fail to convey the whole truth, and are couched in such phraseology as to mislead the unsuspecting reader. An instance we have in mind—a hair preparation, which is declared to contain no *Sugar of Lead*,—true, but it contains the poison lead in another and equally dangerous guise. This prostitution of the professions to such nefarious purposes is shameful, and merits the contempt of all, and should be visited by social and professional ostracism, as well as legal prosecution.

We have lately seen the following attached to a bottle of that miserable class of concoctions known as "Stomach Bitters":

"Having analyzed Prof. Blight's celebrated Stomach Bitters, I find them purely vegetable, and entirely free from deleterious drugs.

W. W. Lancaster, M. D., Analytical Chemist.

*Graduate of the Philadelphia College of Pharmacy*, 1858."

Being unable to find the name of W. W. Lancaster in the list of graduates of the Philadelphia College of Pharmacy, we addressed a note of inquiry to Prof. Bridges, Dean of the faculty. From him we have learned that no such person has ever graduated from that institution, and for the credit of our Alma Mater we are glad it is so. Who, then, is W. W. Lancaster? is his title of analytical chemist as well earned as the other he assumes, or is he a creature of the inventive genius of "Prof. Blight"? We leave our readers to conjecture.

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## DISINTERESTED CHARITY.

Apothecaries have at last found one who, appreciating the unrequited labors of their calling, comes to the rescue. With many others of our profession we have had the honor (?) to receive from an individual styling himself H. T. Helmbold, a lengthy letter which is full of lamentation over the hard lot of the poor apothecary selling pills at three cents a dose; he purposes to add to their meagre income by raising the wholesale price of his valuable (?) medicines to one dollar per bottle. We are highly gratified at the sacrificing, unselfish intention of this Good Samaritan, and only regret that he has tarried at the insignificant figure of one dollar, when he might have made it double, yes, treble that sum per bottle; for he truly remarks that money is of no consideration to suffering humanity, and he is doubtless also a believer in the adage that all fools are not yet dead.

Grateful for the interest he has manifested in our pecuniary welfare, we shall shortly return the compliment by a special notice of his unrivalled (in what?) nostrums, inserted free of charge.

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BOOKS, &c., RECEIVED.—"The American Journal of Pharmacy," published by authority of the Philadelphia College of Pharmacy. Fourth series, Vol. 1, No. 1. As intimated in our December issue, the American Journal of Pharmacy, for so many years the exponent of pharmacy in this country, is now published monthly instead of bi-monthly, as formerly. The number of its pages has been diminished one-half, or to forty-eight pages, by the change, but this will leave the size of the volume unaltered. This change to a monthly we regard as a decided step in advance—an improvement which will doubtless be appreciated by its readers. Our only regret is in regard to the retirement of Prof. Proctor, who has so faithfully and ably edited the journal during the many years of his connection with it. His resignation, we learn, is to take effect in March, and we can not let this occasion pass without a word of congratulation to him upon the signal success with which he has performed his editorial labors, and an acknowledgment that to him, more than to any other single person, are we indebted for the many improvements in American Pharmacy, recorded during the last thirty years. We are sure Prof. Proctor will have the inclination, indeed, will be impelled by force of habit to continue his contributions to science, and to assist by his pen and counsel in the great work yet to be accomplished in the way of pharmaceutical legislation.

The subscription price of the American Journal of Pharmacy remains unchanged, —$3.00 per annum.

"The Half-yearly Abstract of the Medical Sciences," being a digest of British and continental medicine, and of the progress of medicine and the collateral sciences. Edited by William Domett Stone, M. D., F. R. C. S. Vol. lii. January, 1871. Philadelphia, Henry C. Lea.

"The American Journal of the Medical Sciences," edited by Isaac Hays, M. D., assisted by I. Minis Hays, M. D. Published quarterly, by Henry C. Lea, Philadelphia.

As epitomes of the progress of medicine at home and abroad, these works leave little further to be desired. It is next to impossible for the busy practitioner to read all of the contributions to the science of medicine in the vast array of medical journals, hence the necessity for well chosen abstracts, selecting the wheat from the chaff, embodying all that is new or worthy of record. The Half-yearly Abstract, The American Journal of Medical Science, and the Medical News and Library, the latter a monthly publication, are furnished to subscribers at the low price of $6.00 per annum, free of postage.

"The Tripod." This is the title of a new and sprightly monthly, published by the under-graduates of the Northwestern University, and is conducted in the interests of that institution. Devoted to literature and the sciences, it has a wide field of labor, and certainly will prove a very interesting journal, and should receive a liberal support.

Terms, $1.00 per annum. Subscriptions, exchanges, &c., should be addressed to The Tripod, Lock box 22, Evanston, Ill.

"Vaccination and its Protective Power, in the State of West Virginia." A Report to the Governor, November 8, 1870. By John C. Hupp, M. D., State vaccine agent.

# THE PHARMACIST

AND

CHEMICAL RECORD.

VOL. IV. CHICAGO, MARCH, 1871. No. 3.

## ON THE PREPARATION OF FERRIDCYANIDE OF POTASSIUM.

BY WILLIAM T. WENZELL.

Ferridcyanide of potassium is usually prepared by the process of Gmelin, the discoverer of this salt, by passing chlorine slowly into a dilute solution of yellow prussiate of potash, until the liquid ceases to yield a precipitate on the addition of a persalt of iron. The chemical reaction which takes place in this process, depends upon chlorine abstracting one equivalent of potassium from two molecules of ferrocyanide of potassium, which coalesce to form one molecule of the ferridcyanide of potassium, chloride of potassium being formed at the same time, as follows: $2(K_2\ Cy,\ Fe\ Cy) + Cl = K_3\ Cy,\ Fe_2\ Cy_3 + K\ Cl$.

This process is no doubt one of the best, and when the action of the chlorine can be interrupted in time to prevent the decomposition of a portion of the product into chloride of cyanogen and various secondary compounds, which are known to act injuriously by their presence in preventing, to some extent, the subsequent crystallization of the salt. This loss and inconvenience is avoided, according to Prof. Reichardt, of Jena,* by substituting bromine for chlorine, which will prevent the occurrence of the decomposition to which the ferridcyanide is liable by the prolonged action of chlorine. Aside from this advantage, the author recommends his process on the ground of greater facility with which the salt is prepared. The reaction is in every way identical with that of chlorine; the product being ferridcyanide of potassium and bromide of potassium: $2(K_2\ Cy,\ Fe\ Cy) + Br = K_3\ Cy,\ Fe_2\ Cy_3 + K\ Br$. In regard to the economy of a process, which calls for the use of bromine,—an article although of late years greatly reduced in value,—few manufacturers could be induced to adopt such an expensive substitute.

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* Dingler's Polytechn. Journal, Dec. 1869.

The process which I have used for years, and for which I claim results as advantageous as the bromine process, with the additional desideratum of cheapness, is based on the action of chlorine, which is formed and made to act upon the yellow prussiate in statu nascenti during the process. Four equivalents of hydrochloric acid and one of bichromate of potassa, are made to act upon a boiling solution of ferrocyanide of potassium, with the formation of two equivalents of ferridcyanide of potassium, three of chloride of potassium, one of sesquioxide of chromium, one of water and one of chlorine, as exemplified by the following equation: $4(K_2\,Cy,\ Fe\,Cy) + KO\,2Cr\,O_3 + 4\,HCl = 2(K_3\,Cy,\ Fe_2\,Cy_3) + 3KCl + Cr_2\,O_3,\ 3HO + HO + Cl.$

Reduced from equivalent to working quantities, the following formula will give satisfactory results:

Bichromate of potassa, 1 part, by weight.
Ferrocyanide of potassium, cryst., 5.72 parts, by weight.
Muriatic acid, spec. grav. 1.16, 3 parts, by weight.
Water, 60 parts, by weight.

Dissolve the two salts in hot water, add the acid, heat to boiling, continuing the ebullition, replacing the water evaporated during the process, until a portion of the filtered liquid is not precipitated on the addition of sesquichloride of iron. When reaction is completed, filter the liquid and wash the hydrated sesquioxide of chromium, unite the liquids and concentrate to crystallization. If the evaporated liquid possess an acid reaction, the addition of caustic potassa, in sufficient quantity to cause a weak alkaline reaction, will greatly facilitate the subsequent crystallization. Generally, there is no difficulty experienced by following these processes, if the relative proportions are used in the prescribed equivalent amounts. An excess of muriatic acid should be studiously avoided, inasmuch as an excess will contaminate the solution of red prussiate of potash with sesquichloride of chromium, which will communicate an emerald green color, and give a green precipitate of hydrated sesquioxide of chromium on the addition of ammonia.

*San Francisco*, *February*, 1871.

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## ON A MORPHIOMETRIC PROCESS FOR THE PHARMACOPŒIA.

BY WILLIAM PROCTOR, JR.

The question, "What is the best process for assaying opium to determine its morphia strength, suited for adoption into the United States Pharmacopœia?" was accepted by the writer at the Chicago meeting.

Reflection on the query suggests that it is not so much what is the best analytical process, as to decide what process is best suited for practical use by druggists and pharmaceutists in determining the morphia value of opium for the purposes of the Pharmacopœia. Those who take the view that the process should embody the nicest and most refined manipulations of the analytical laboratory, may not accept this view, but when it is understood that a large majority of the persons needing its use are not analytical chemists, it is believed that simplicity, united to a fair degree of accuracy, is more available than extreme accuracy, beyond the reach of most apothecaries, applied in a complex process.

So many able chemists have published processes, some of which are well known in connection with their names, as Staples' process, Mohr's Guillermond's, &c., that the ground would appear to be well examined. The process of Staples is that of the United States Pharmacopœia. Its point is in the employment of alcohol to retain the coloring matter in solution during the precipitation of the morphia, and in mixing the ammoniacal precipitant also with alcohol. The process of Mohr avails itself of the selective power of boiling lime-water to reject narcotina, and retain morpia in solution. Both of these processes extract the opium with cold water. Guillermond's process employs alcohol of 71 per cent. to extract the opium, which is then precipitated by ammonia. The precipitate, as in Staples' process, contains narcotina.

One difficulty in extracting the portion of opium soluble in water is the caoutchoucoid matter which tends to resist its solvent action. The idea of employing benzine or light coal oil to remove this, as well as the free narcotina, has been suggested by Albert E. Ebert for another purpose, and has been used by Dr. Fluckiger in his examination of opium. It is believed that the preliminary use of this solvent in opium assays may be usefully adopted.

Believing that the best way to arrive at a solution of the query was to try several processes with the same solution of opium, a sample of nearly dry opium, weighing 300 grains, was triturated to coarse powder, and then rubbed with repeated portions of water, until finely divided and macerated in six times its weight of water for twelve hours, then percolated on a filter until the washings were nearly colorless. The united liquids (amounting to 4500 grains) were divided into three equal portions, each representing 100 grains of opium.

No. 1. The solution was evavorated with moderate heat to half a fluid ounce, mixed with an equal bulk of alcohol (sp. gr. 835), filtered through a small filter, and the latter washed with a little diluted alcohol. 50 minims of solution of ammonia (sp. gr. 960) was mixed with 2 fluid drachms of alcohol. One-half of this was added to the alcoholic solution of opium with agitation, and allowed to stand six hours, when the remainder of the ammonia was mixed in and the vessel permitted to rest for twenty-four hours. The crystalline matter deposited on the interior of the vial being detached, the contents were at intervals poured on a small-tared filter, and the crude morphia washed first with diluted alcohol and then with water, dried at 120°, and weighed. The product was 9.75 grains. This was treated several times with boiling non-alcoholic ether, and the ethereal solution evaporated in a small-tared capsule gave 0.31 grains of crystalline prisms, equivalent to 0.31 per cent. of narcotina, and 9.44 per cent. of morphia in the opium examined.

No. 2. This portion was treated with solution of subacetate of lead till it ceased to be precipitated, the precipitate seperated on a filter and well washed, the filtrate treated with diluted sulphuric acid by drops, to separate the excess of lead as sulphate, and filtered. The clear solution by moderate heat is reduced to half a fluid ounce, mixed with its bulk of alcohol filtered, and the filtrate mixed with fifty grains of solution of ammonia containing alcohol, in two portions added half an hour apart, and allowed to stand twenty-four hours. The morphia was deposited in large distinct crystals, very few of which were attached to the interior of the vessel. They were collected on a filter, washed with diluted alcohol and water, dried and weighed 8.75 grains. This, repeatedly boiled in ether and the ethereal liquids evaporated, afforded but a trace of crystalline matter, too small to weigh and yet distinctly visible in minute prisms.

No. 3. This was mixed with sixty grains of lime, previously hydrated and boiled for fifteen minutes, the decoction filtered hot from the dregs, and these well washed with hot water. The filtrate slightly acidulated with muriatic acid was evaporated to half a fluid ounce, mixed with its bulk of alcohol and filtered; an excess of alcoholic ammonia was added and mixed, and the vessel set aside for twenty-four hours. The colored crystalline powder and the portion attached as a crust to the interior, were carefully collected on a filter, washed, dried and weighed, affording ten grains of impure morphia, more colored than either of the other results.

The use of alcohol in this process is intended to retain the coloring matter, yet did not succeed in producing a light-colored morphia.

The last result, according to Mohr, should contain no narcotina, yet when boiled to exhaustion in ether deprived of alcohol, the ethereal liquid afforded 0.75 grain of narcotina, making the result of morphia 9.25 per cent., and narcotina 0.75 per cent.

It will appear, by a comparison of these results, that the Staples' process, whilst less complicated than either of the others, yields a purer product than the Mohr process, and a slightly larger yield of morphia; whilst the process No. 2, which is suggested by the writer, affords the purest and best crystallized morphia, but is more complicated than either of the others. Hence, it is the first, or Staples' process, that is to be preferred, modified by treating the powdered opium with warm benzine as a preliminary operation. The final success is greatly aided by conducting the evaporation of the liquor at a moderate temperature, which renders the product less contaminated with coloring matter. By reducing the bulk before precipitation to the extent noted above, the precipitation of the morphia is facilitated, whilst the crystals are equally light colored. By using benzine beforehand the extraction of the opium will be more thoroughly accomplished.—*Proc. Amer. Pharm. Assoc.*, 1870.

# ON THE PREPARATION OF CHLORAL.

*Extracted from the remarks of* DR. E. R. SQUIBB, *before the American Pharmaceutical Association.*

Chloral is the ultimate product of the action of chlorine on alcohol, as its name implies, the first syllables of the two words being formed into the name; "chlor," the first syllable of chlorine, and "al," the first syllable of alcohol, making "chloral." When chlorine gas in a dry state is passed into absolute alcohol, a series of changes appear to take place, which may depend on the abstraction of hydrogen and the substitution of chlorine. The first portions of chlorine gas that pass into absolute alcohol are converted, or appear to be converted, at once into hydrochloric acid, and that hydrochloric acid is absorbed by the remainder of the alcohol, and reacts with it, producing hydrochloric ether. The second step in the reaction is to again decompose or supersaturate this hydrochloric ether with chlorine, and then hydrochloric acid escapes; and, finally, as heat is applied in the process, the hydrochloric ether escapes and a substitution appears to take place, whereby chlorine is substituted for hydrogen in the already decomposed alcohol. This is but a rude outline of the process. Chloral was discovered by Liebig in 1829 or 1830, although the paper in which it was described was not published until about 1832; therefore it is commonly stated that he discovered it in 1832, which is incorrect. Dumas was the next who investigated it, and these two observers investigated it as a table specimen product. Last year, Dr. Otto Liebreich, in his physiological investigations regarding the group of anæsthetic chemicals, reasoned back to this substance the known effects of chloroform, and tried it first upon animals, then upon patients. At first he supposed it was an anæsthetic, but afterwards modified this view, and now I believe regards it as a hynoptic, and, in some cases, an anodyne. The apparatus for making chloral consists, first, in the means of generating chlorine; second, in the means of drying the chlorine; third, in the means of passing it into absolute alcohol without loss; and, fourth, having the absolute alcohol in such a position that it can be gradually warmed. The process requires about twenty-eight days for the current of chlorine to be passed into the absolute alcohol, and I believe the slower the current passes into the absolute alcohol the better; that is to say, the longer the time which is taken to produce the chloral the better; I think there is less waste and more chloral obtained for the same quantity of alcohol. It is a curious circumstance that hydrate of chloral is produced by passing the chlorine into absolute alcohol, and this shows that water is one of the results of the decomposition of the alcohol; yet if hydrated alcohol be used, the product is different. I have tried different degrees of strength of alcohol, from absolute down to ninety-two per cent., and have obtained good results only from absolute alcohol. 16 gallons of such alcohol, in 28 days, with the use of about a ton and a quarter of mixture of binoxide of manganese and common salt, and about the same quantity of sulphuric acid,—the 16 gallons of absolute alcohol weighing about 92 pounds—I obtained about 160 pounds of crude hydrate of chloral. This crude hydrate of chloral, as it is made by the passage of the chlorine into the alcohol, is contaminated with several other products which pass over in the distillation, and cannot be separated by simple distillation. It is necessary, therefore, to apply sulphuric acid in the purification of the chloral. Concentrated sulphuric acid is shaken with the crude hydrate of chloral, and the dehydrated chloral is then distilled off from the sulphuric acid. In this way we get chloral that is free from water. After purifying this by one or two applications of sulphuric acid, then the stœchiometric proportion of water is added, and it is either sublimed or crystallized. In connection with this hydrature allow me to go back to the name of chloral. I propose to call it simply chloral,—not hydrate of chloral, nor chloral hydrate. It seems to me surplusage, as we do not in our language commonly call hydrated compounds hydrates; that is, we do not usually recognize the presence of combined water in the names of chemical compounds.

We do not say hydrate of sulphuric acid, or hydrate of hydrochloric acid, and in this case we shall save a good deal of nomenclature that is useless by calling it simply chloral. We heard yesterday, that the bees by taking a little honey from each flower gathered thirty millions of pounds. Every flower and every bee helps to make the aggregate. A certain amount of nervous force is expended on every word we utter, and if we save this word now (and now is the time to start), it will save an aggregate of nervous force which, in the future, will amount to a great many lives. I don't believe in useless language, particularly where it can so well be avoided, and, therefore, think we had better call this from the beginning, simply chloral, although the other name is pretty generally used.*

The difficulties in the way of making chloral are very numerous. The apparatus I have now at work is about the tenth modification from the first one, and I started with all the knowledge on the subject then in the books. The liberation of chlorine from common salt and black oxide of manganese by running sulphuric acid into it is easy enough, but unless the current be steady the result is imperfect, and there can be no good or definite calculations made as to the time or the quantity. The black oxide of manganese and common salt need both to be assayed and added together in their equivalent proportion, and then the calculated amount of sulphuric acid in any given specimen is to be made upon its specific gravity, and the acid can only be added to the mixture by calculation, because, if added until chlorine ceases to be eliminated a great excess will be used. I mix 100 pounds of the mixture of black oxide of manganese and common salt with about ten gallons of water in a still, and then run seven gallons of 60° slowly into it, using "pan acid," 1,562 specific gravity, using a mechanical stirrer, and heating the mixture. In this a tolerably uniform current of chlorine is eliminated. This is then conducted to the drying apparatus, which consists of a three-neck Woulfe's bottle, with a long, narrow glass percolator ground into the middle neck. This percolator is filled with pieces of broken glass from which the fine particles have been sifted out, and into the top of this broken glass, concentrated sulphuric acid is supplied from an elevated reservoir. This acid percolates through the broken glass, and accumulates in the Woulfe's bottle below until it reaches the level of an adjusted syphon, by which it is discharged through one of the necks of the bottle. Through the third neck the chlorine enters by a tube which dips under the acid in the bottle. Thus the gas is made first to bubble through the acid in the bottle, and then to pass over the extended surface of broken glass in the tall percolator, this surface being kept moistened with fresh portions of acid, and thus becomes thoroughly dried and in the proper condition to enter the alcohol. The chlorine thus passed down into the alcohol at first increases the volume of the alcohol by one-fourth. At first, the whole of the bubbles of gas are absorbed, and the alcohol increases in volume and becomes heated, the bottle requiring to be kept cold; but after about three days the reaction between the chlorine and alcohol becomes more sluggish, and then a little heat in the bath is necessary. From that time the bath is made gradually warmer until the end of the process, which is determined by the gas pressing unchanged through the hot liquid in the bottles. The product is then the crude hydrate of chloral. Then if the contents of the bottles be allowed to cool a large proportion crystallizes. It will not run from one part of the bottle to another, but still is very moist. This is taken in portions of about twenty pounds at a time and shaken up with six to eight pounds of strong sulphuric acid, the whole mixture poured into a tubulated retort and the chloral distilled off. This is received in a clean, dry vessel, is weighed, and then partially hydrated with a weighed quantity of water. Carbonate of lime and slacked lime are then added in the proportion of four ounces to each twenty pounds, and the mixture is again distilled from a clean apparatus. The result of the distillation now is partially hydrated chloral; it distils better partially hydrated than when hydrated entirely. The remainder of the water required by stœchiometrical calculation is now added, and the hot liquid poured on plates to crystallize, the plates being covered by a bell glass. In a few hours the crystallization is complete, and if well managed the contents of the plates is in a solid cake, which is rubbed into a coarse, damp powder in a clean mortar, and filled into bottles.

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* While this note is being prepared for publication a serious mistake, by abbreviating the words Hydrate of Chloral to "Hyd. Chlor." in prescription, was corrected in time to avoid danger.—E. R. S.

I obtained from 16 gallons of absolute alcohol, 160 pounds of crude chloral, which, when purified, yielded in the neighborhood of 125 pounds of purified hydrate of chloral. That is about the best yield I have had. I have now about 65 gallons in process all the time, by a series of baths, by which I expect to get 140 pounds, or thereabouts, every week, or every ten days; that is, each bath being of a different age, and being finished in about thirty days, will give one bath or process every ten days. It will thus be seen that it is not a very profitable preparation to make, particularly when made in competition with the German article, and I believe I should never have undertaken to make it, except for my conviction that it is the most important of all the additions to the materia medica for many years past, and very commonly sent to our market from abroad of bad quality, and without any traceable responsibility in regard to quality or make.

Some accidents of an apparently trivial nature seemed to indicate that chloral is very liable to decomposition from contact with organic matter, but experiments have shown that it is not equally liable to this decomposition from all kinds of organic matter. Even the same kind of organic matter does not always produce the same effect with the same chloral. For example, where syrup of orange-peel is used as a vehicle, decomposition, with the production of hydrochloric acid, will sometimes commence in a day or two, and sometimes not for weeks, though the apparent conditions be the same. One observer will testify that with simple syrup it never spoils or decomposes, while another, equally trustworthy, will find the same chloral decompose with simple syrup very promptly. Under such circumstances, the only safe practice is to keep chloral as free as possible from all organic matter until we know more about it; and this particularly in view of the harm it does when given in even a partially decomposed solution. It appears to be by far the best practice to dispense it in simple watery solution in glass-stopped vials, since in this condition it keeps indefinitely, and can be added to any desired vehicle at the time of taking. And ice-water appears to be about as good a vehicle for this, as for all saline substances, as any yet devised. When given to patients who have been long fasting it is often found to disagree with them, or at best to affect them less favorably than when given near a meal, or when the gastric secretions are not in the condition of long fasting. Hence, the syrup of orange-peel, or the mucilage, &c., with which it is common to give it, may not be without useful effect, and those physicians who have now abandoned these mixtures for the simple solution, often if not generally, advise their patients to eat a cracker, or take some other light food in small quantity, before or immediately after an hynoptic dose. When the medicine affects persons unfavorably, it should always be examined for hydrochloric acid by smelling and tasting, and by litmus paper. Nitrate of silver is too sensitive a test, for if the solution have been some time made, and especially when water containing organic matter is used, a cloudiness may be produced with this test which it is quite safe to disregard.—*Proc. Am. Ph. Association*, 1870.

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# ON FERMENTATION.

BY PROFESSOR A. W. WILLIAMSON, F.R.S.

*Before the Society of Arts. Reprinted from the Pharmaceutical Journal, London.*

## LECTURE I.—CONTINUED.

Take another experiment. I have here something which is not a *blanc mange*, although it looks something like it; it was made by boiling potato-starch with water. We let it cool, and then turned it out; some was put into a flask with two or three ounces of crushed malt. It was warmed to a temperature of 60° Centigrade for about an hour; there was no boiling. The substance was then squeezed through a cloth to keep back the husks of the malt, and here is the liquid which ran through. It is perfectly liquid, and its consistency is entirely different from that of starch, from which it was made; it is quite sweet to the taste, and there is a large quantity of sugar in it. There is also another body which we class with the sugars; that is, there is in this liquid a good deal of a kind of gum, which we call dextrine, which would easily pass into sugar. The starch, when it was being converted by the action of the malt into those soluble bodies, did not, so far as we know, break up into simpler substances; the process was of a different kind. It assimilated the water—the starch combined with the water, and at the same time divided itself, some of it forming one and some the other product. Here, also, there was not, as far as my knowledge goes, any ferment or any organized cells in the liquid. If they were present it was an accident, and was not essential to the change which took place. I am the more confident in saying that no ferment was there present, for we can get, and we very often do get, precisely the same formation of starch without any malt at all. If, instead of warming some of that starch with the infusion of malt, I had mixed it with a little—about five per cent.—of that strong sulphuric acid, and had heated it, it would have been dissolved almost like sugar in water. In fact, there are now in Germany, and also in England, manufactories in which starch is converted, by the action of dilute sulphuric acid, into grape-sugar, and the same change which we get by organic substances—that is the point—we also get by the action of this mineral acid.

Another change of the same kind I may mention, especially as the subject of it is in itself interesting. I have here a substance which people have been accused of making for the purpose of adulterating quinine. It is made from willow-bark, and is believed to possess febrifuge qualities, so that there was some little excuse for what I have mentioned. This substance is called salicine, and when heated with dilute sulphuric acid, in the same way as the starch when so heated was converted into sugar and dextrine, this salicine breaks up in a way which I might compare with that in which some bodies are broken up by fermentation.

Another case of the same kind is afforded by tannin, a substance extracted from gall-nuts, and which is present in oak and many other barks. It is used for combining with gelatine, which is the principal constituent in hides, to form leather. If we dissolve this tannin in water, and leave it in an open vessel, it will get mouldy; and if you examined it after some time you would find none of it left. It would all disappear, just like sugar in the process of fermentation, and in place of it you would find, in that particular process, a body which you might easily crystallize out from the liquid, and which I have here; it is called gallic acid. It is a body resembling tannin in some respects, for instance, in the property of forming, in combination with iron, a dark substance, which is used in suspension in water, for writing-ink. But it will not do to form leather in combination with gelatine. If you left the tannin in an open vessel, it would decompose, and there would be left gallic acid, and some other material which was formed at the same time would have disappeared. By boiling tannin with dilute acid, we get the process performed more regularly. Upon boiling some tannin with dilute sulphuric acid, you would find that water would be taken up by it, the tannin would combine with water, and it would break up into sugar and gallic acid, the process being exactly like that which I mentioned in the case of salicine. There is a most direct analogy between the process of breaking up which sulphuric acid effects upon tannin and that of fermentation. I ought to say, when telling you of the decomposition of the tannin, that it is effected by little animal organisms present in the liquid, and it appears that they are the agents of the transformation.

Then there are some other processes of considerable importance, from their occurrence in the animal economy—processes which I believe must be classed between those experiments which I showed you a little while ago and the process of fermentation,—I mean processes which occur in the operation of digestion. I have here a gelatinous solid, which contains a substance called pepsine, which was made by dissolving the inner lining of a pig's stomach in diluted hydrochloric acid at about blood-heat. The inner lining of the stomach of that and similar animals is dissolved gradually, and that solution possesses the property of dissolving muscular fibre, white of egg, and other similar substances; it is, in fact, artificial gastric juice, and it would, for instance, dissolve that lump of gluten which I showed you just now—which looked something like india-rubber—and when this pepsine dissolves albumen by digestion, for the process is doubtless of the same kind as that which occurs in the animal economy, it does so by breaking it up into bodies which are no doubt simpler than itself, bodies which we do not know accurately and fully. They are called peptones, for it is common enough to give names to bodies even before one knows them well. I do not know whether it is a good plan, but it is customary. These bodies are a good deal similar to those which are present in malt, and in such like mixtures, which have undergone vital changes.

Then I will give you one or two other cases of similar processes. Here is a singularly beautiful acid, called hippuric acid, which decomposes with very great readiness if left in the liquids in which it is originally found. When that organic mixture is exposed to the air, it undergoes a process of putrefaction. The general appearances which take place in the liquid while the substance is decomposing, would certainly be described by anybody as a putrefactive process, and there is formed by its decomposition some of this other beautiful acid, called benzoic acid, because it was originally obtained from the fragrant gum benzoin. At the same time there are other products given off which decompose. Now we can, by mineral substances, effect the same decomposition of that hippuric acid. A German chemist, to whom we owe many researches in these matters, showed, some years ago, that if you boiled hippuric acid with dilute sulphuric acid, it takes up water, and breaks up into benzoic acid, and this crystalline substance, called glycocol or sugar of glue. It got that name from the circumstance that it was obtained originally from glue by a decomposing action, and it has a sweet taste. It has no analogy to sugar in its nature, but it has that superficial resemblance that it is rather sweet.

This hippuric acid affords another case of a body which is broken up, either by putrefaction or by the action of dilute sulphuric acid. It affords a strong argument, and other cases I have adduced afford, like it, an argument that the action of these organic substances resembles the action of sulphuric acid. If we get the same change in several cases by the action of an organic body as by the action of a mineral body, the fact certainly goes some way towards showing that the two substances must be in their mode of action, generally alike. There is another case, that of urea, which, in contact with water, forms a carbonate. That may be done by either class of re-agent.

There are, however, some chemical processes even simpler than these, and for that reason they are better known to us, which really may be studied with advantage side by side with those I have mentioned, and they will, I think, afford us, on further consideration, a key to the explanation of these processes. I will only mention two. One is a process which is well known in its general features, and it is a process of breaking up truly analagous to those I have mentioned, but a perfectly simple breaking up of alcohol into two substances, both of them well known now, one being water and the other ether. It is a process which consists in dividing the elements of alcohol in such a way as to get nothing formed but these two products, though side by side with this change there are some secondary changes which do not belong to the process. This change is effected solely by the action of oil of vitriol or sulphuric acid. It has been long known, and it was a subject of wonder for some time that if sulphuric acid is mixed with alcohol and heated, you can distil off some alcohol from the mixture in the form of these two products; then you may add some more alcohol, and if you distil that off, it is also broken up into ether and water; then you may add some more again, and you may go on adding alcohol to that original quantity of sulphuric acid, and it will decompose each successive portion into these two products. There is no limit known to the extent to which sulphuric acid will effect that change. You perceive, therefore, that this, in its general features, is a process analagous to those which we were considering at first.

I may illustrate that by an experiment. First, I will show you how we discover the presence of sulphuric acid. The common test is, to add some salt of baryta—this which I have here is a chloride—to the sulphate, when we get at once a precipitate, sulphate of baryta. The sulphuric acid, in making the ether, passes over into a compound that does not possess this property. I have some of it here. It is a clear liquid, and on mixing it with the same re-agent I used just now, you see that it will not form the precipitate; I put some of the same baric chloride into it, but, as you see, the liquid remains clear. But I can bring back my sulphuric acid to its original state. Mr. Taylor, my assistant, was heating some of it just now, and it has been standing so long that it has returned to its original state already. It has returned from the state in which it does not precipitate baryta to the state in which it does. There is in the process a successive departure of the sulphuric acid from its ordinary state, and a return to that original state; it is a kind of circle or cycle. The substance passes over into a compound which does not precipitate baryta, and then it returns again to its original form, and that is the key to the anomaly. When the sulphuric acid has effected the decomposition of one portion of alcohol into ether and water, it comes back again to sulphuric acid, becomes exactly what it was in the beginning, and is able to recommence precisely the same combination.

I will give you another example of it: I have here a substance used in one of the commonest manufactures, that of oil of vitriol, in which the same operation occurs. I have there a substance at work called nitric oxide. It is converting a quantity of sulphurous into sulphuric acid. In principle it would so convert an infinite quantity, but in practice it is limited by convenience. It acts by carrying oxygen from the air to one portion of sulphurous acid and then to another, and thus it goes on, and effects successive oxidations of a great number of particles of sulphurous acid, forming sulphuric acid from them, and it does that in virtue of a process perfectly analagous to that which I just now mentioned. The gas, after one operation, returns to the same state in which it was in the beginning of the first operation; it is a cyclical process. I have here some of the nitric oxide combined with oxygen, and when in that state it has the red color which you see in the flask. If we blow a little sulphurous acid into it, the red color will disappear as the nitrous acid gives up the oxygen, the nitric oxide itself being a colorless compound, but in combination with oxygen it is red. As the sulphurous acid passes into it, the nitric oxide parts with the oxygen and becomes colorless, but on again blowing in a little oxygen it returns to its former red color. This shows you that there are processes, of simple, normal, chemical action, somewhat analagous to those fermentive properties which I formerly described. Each one of these processes takes place in perfectly definite proportions, the peculiarity being that one material which takes part in them returns at the end of one operation to the same state in which it was at the beginning of the operation, so that the processes are cyclical, and this re-agent is able, by acting successively on a large quantity of particles, to repeat its action very frequently upon them, and beyond what would appear to be its definite combining proportion. You see this red compound of nitric oxide and oxygen has lost a great deal of its red color. I will not wait until it is completely bleached, but will blow in a little oxygen, when we shall get a return to the original deep red color. This is the ordinary process by which sulphuric acid is made on a large scale in lead chambers. The sulphurous acid is allowed to remain a considerable time in the chamber, and is passed on from one to another, as it is acted on by the nitric oxide, which passes through the successive stages of its action by a process which I should be glad to name cyclical, as I shall have occasion again to revert to a similar process of the same name. At our next meeting I shall have to analyze some of the best known, and also some less familiar instances of cyclical action, that we may arrive at a conception of their nature.

*(To be continued.)*

# DRAFT OF A PROPOSED LAW.

## AN ACT TO REGULATE THE PRACTICE OF PHARMACY AND THE SALE OF POISONS IN THE STATE OF ILLINOIS:

### *PREAMBLE.*

WHEREAS, The vending, compounding and dispensing of Medicines, Drugs and Chemicals by incompetent and unqualified persons, is attended with inconvenience and danger to the health and lives of the people. And,

WHEREAS, It is expedient and necessary to provide a more perfect and rigid system for the control and regulation of the sale of Poisons in the State of Illinois. Therefore,

SECTION 1. *Be it enacted by the people of the State of Illinois, represented in the General Assembly*, That from and after the first day of August, 1871, it shall be unlawful for any person, unless a registered Pharmacist, or registered Assistant Pharmacist in the employ of a registered Pharmacist, within the meaning of this act, except as an aid or apprentice under the immediate supervision of a Registered Pharmacist, or of a Registered Assistant Pharmacist, to retail, compound or dispense Medicines or poisons, except as hereinafter provided.

SEC. 2. Any person, in order to be registered, in the meaning of this act, must be either a graduate in Pharmacy, a practicing Pharmacist, or a practicing assistant in Pharmacy.

SEC. 3. Graduates in Pharmacy must be such as have had four years experience in a store where the prescriptions of medical practitioners are compounded, and have obtained a satisfactory diploma, or credentials of their attainments, from a regularly incorporated College or School of Pharmacy.

Practicing Pharmacists, in the meaning of this act, within this State, shall be such persons only as at or prior to the passage of this act, have kept and continue to keep open store for compounding and dispensing the prescriptions of medical practitioners, and for the sale of drugs and medicines.

Practicing assistants in Pharmacy shall be such persons, of not less than 18 years of age, as at or prior to the passage of this act, have been and are employed in the compounding of prescriptions of medical practitioners, in the store of a practicing pharmacist in this State, and shall furnish such evidence of their attainments and competency, to the Board of Pharmacy, as required by the filling of form set forth in Schedule E of this act; and hereafter no person, except a graduate in pharmacy, within the meaning of this act, shall be qualified for registration, either as a Registered Pharmacist or a Registered Assistant Pharmacist, unless he shall have had four years experience in a store where the prescriptions of medical practitioners are compounded, and shall have passed an examination before the Board of Pharmacy, as hereinafter provided.

Sec. 4. On or before the first day of April, 1871, and biennially thereafter, or as necessary to fill vacancies, the regularly incorporated College or Colleges of Pharmacy of the State of Illinois, shall nominate twelve of the most skilled and experienced pharmacists of said State, out of which number the Governor of the State of Illinois shall, within thirty days thereafter, appoint *three* persons, who shall constitute the

## *BOARD OF PHARMACY.*

The members of said Board shall, within thirty days after their appointment, individually take and subscribe, before the clerk of any county court in said State, an oath faithfully and impartially to discharge the duties prescribed by this act. They shall hold office for the term of two years, and until their successors are elected and qualified; and in case of vacancy, by removal from the State, ceasing to do business as a Registered Pharmacist, or from any other cause, the Governor shall fill said vacancies by appointment from those nominated to him. The Board shall organize for the transaction of business, on or before the first day of June, 1871, in the city of Chicago, by the election of a President, a Treasurer, and a Secretary; the Secretary shall also be Registrar. The Board shall meet semi-annually thereafter, and oftener if necessary, in the cities of Springfield and Chicago.

Sec. 5. The duties of the Board of Pharmacy shall be to examine all candidates presenting themselves; to direct the registration by the Registrar of all persons properly qualified or entitled under this act; and to cause the prosecution of all persons violating its provisions. Immediately after organization the Board shall appoint, in each city or town where it shall be deemed necessary, two Registered Pharmacists to act as examiners, who shall qualify in the manner prescribed for the Board of Pharmacy, and whose duty it shall be to examine all candidates for registration as Assistant Pharmacists who may appear before them. Each applicant shall pay a fee of one dollar to each of the two examiners, and if passing an examination satisfactory to both shall be furnished with a certificate to that effect, which certificate shall be sent, with a fee of three dollars, to the Registrar, upon the receipt of which he shall register the applicant, and return a certificate of qualification, according to form of Schedule F appended to this act. Pharmacists applying to the Board for examination shall pay a fee of five dollars, and if passing the examination to the satisfaction of the Board, or any two of them, shall be furnished with a certificate without charge, in accordance with Schedule F of this act. The Registrar shall be paid a salary of not less than $500 per year; the other members of the Board shall be paid a compensation while in session only, of Five Dollars per diem, with cost of railroad travel to and from the place of meeting. All expenses arising under this act shall be defrayed from the moneys received for fees and penalties herein prescribed, and any surplus of revenue remaining at the close of each official year, after all expenses shall have been paid, shall be divided and paid in equal amounts to the Library Fund of the regularly incorporated College or

Colleges of Pharmacy of this State, to be used for increase of Library only.

Sec. 6. The duties of the Registrar shall be to keep a book for Registration at some convenient place in the City of Chicago, of which he shall give due notice through the public press, and in which shall be entered under the Supervision of the Board of Pharmacy, the name and place of business of every practising pharmacist who shall apply to him in either of the forms set forth in Schedules "D" or "E" appended to this act, producing proper evidence, in accordance with Section "3" of this act, and of all who have passed a satisfactory examination. It shall also be the duty of the Registrar to erase from his register the name of any Registered Pharmacist who may have died, removed from or ceased to do business in this State, and to make all necessary alterations in the location of the persons registered under this act.

The Registrar shall annually publish a list of all persons that are duly registered as Registered Pharmacists and Registered Assistant Pharmacists, a copy of which shall be mailed free to each and every Registered Pharmacist in this State,

The Registrar shall report annually to the Governor of the State upon the condition of Pharmacy, together with the names of all Registered Pharmacists and Registered Assistant Pharmacists duly registered under this act.

Any misconduct or falsification on the part of the Registrar, shall be reported by the Board to the Governor, who shall remove said Registrar and appoint his successor. The Registrar shall pay all moneys received, to the Treasurer, taking his receipt therefor.

Sec. 7. The Treasurer shall receive all moneys, and shall disburse the same under the direction of the Board. He shall keep an accurate account, which shall be always subject to the inspection of the Board. He shall give good and sufficient bonds for the faithful performance of his trust, which shall be satisfactory to the Board.

Sec. 8. No person shall be allowed to assume, use or exhibit the title of Registered Pharmacist, or of Registered Assistant Pharmacist, unless he shall have actually been registered as such in accordance with this act.

Registered Pharmacists shall be such persons only as are in business on their own account, and are registered as provided in this act.

Registered Assistant Pharmacists shall become Registered Pharmacists upon assuming business on their own account, and on being registered as provided by this act.

Any person desiring registration under this act, must apply in writing to the Registrar within sixty days after publication of the notice required in Sec. 6, using the form prescribed in Schedule D or E. In case of failure or neglect to be so registered, they shall forfeit the advantages conveyed to them by Section 6 of this act; for such registration each and every person so registered shall pay to the Board of Pharmacy the sum of one dollar, to be applied to the payment of the expenses arising under this act. It shall be the duty of every Registered Pharmacist, upon changing his place of business, to forthwith notify the Board by letter of such change, and to enclose a fee of one dollar, upon receipt of which, the Registrar shall make the necessary alteration in his Register. And it shall be the duty of every Registered Pharmacist, and Registered Assistant Pharmacist, to notify the Board, by letter, on the first day of June of each year, whether he still continues practicing pharmacy at his registered place of business, and to enclose a fee of one dollar for the insertion of his name and business address in the register for the ensuing year. The Registrar shall notify every person who shall not have notified the Board as herein provided; and in case an answer, enclosing an additional fee of fifty cents, shall not be received by the Registrar within fourteen days, such name shall be stricken from the register; provided, always, that his name shall be restored to the register on the payment to the Board, within one year, of a fee of five dollars.

The Registrar shall, on the demand of any Registered Pharmacist, or Registered Assistant Pharmacist, accompanied by a fee of one dollar, give him a neatly engraved certificate, signed by the officers of the Board.

SEC. 9. Any Registrar who shall wilfully make any falsification in the Register; and any person who shall attempt to procure registration for himself, or for any other person, under this act, by making or causing to be made any false representation, shall be deemed guilty of a misdemeanor, and shall, on conviction thereof, be sentenced to be imprisoned for a term not exceeding twelve months, and in addition thereto, may be fined a sum not exceeding five hundred dollars.

Any person not a Registered Pharmacist, who shall, after the first day of August, 1871, keep open shop for the retailing or dispensing of medicines and poisons, or who shall use the title of Registered Pharmacist or Registered Assistant Pharmacist, shall, for every such offense, be deemed guilty of a misdemeanor, and on conviction shall be liable to a penalty of fifty dollars; provided, however, that in rural districts, where there is no Registered Pharmacist within two miles, it shall be lawful for retail dealers to procure licenses from the Board of Pharmacy, at a fee of one dollar, to sell the usual medicines and poisons; excepting, however, the poisons enumerated in Schedule "A" of this act.

And any Registered Pharmacist, or licensed retailer of poisons, who shall fail to comply with the regulations of this act, in regard to retailing poisons, shall be liable to a penalty of fifty dollars for each offense.

But be it provided, that nothing herein contained shall apply to or interfere with the business of any practitioner of medicine, who does not keep open shop for the retailing of medicines, nor with the business of wholesale dealers in sales to retailers and physicians, or for use in the arts.

It is further provided, that all fines collected under this act shall be paid to the Board of Pharmacy, and the same shall be used as provided in the case of fees.

SEC. 10. And be it further enacted, that from and after the first day of August, 1871, it shall be unlawful for any person to sell, either by wholesale or retail, any poison enumerated in Schedules A and B, appended to this Act, without distinctly labeling the bottle, box, vessel or paper, and wrapper or cover, in which said poison is contained, with the name of the article, the word poison, and the name and place of business of the seller.

Nor shall it be lawful for any person to sell or deliver any poison enumerated in Schedules A, B or C of this Act, to any individual appearing at the time unduly excited or intoxicated; nor to any child of less than twelve years of age; nor to any person whatever, unless, upon due inquiry, it is found that the person is aware of its poisonous character, and that the purpose or purposes for which it is to be used are found to be legitimate, safe and usual.

Nor shall it be lawful for any Registered Pharmacist, Registered Assistant Pharmacist, or authorized retailer of poisons, to sell or deliver any poison included in Schedule A to this Act, without, before delivery to the buyer, making, or causing to be made, an entry in a book kept for that purpose only, and to be always open to the inspection of the Board of Pharmacy, the Board of Health, the Coroner, and the officers of the different Courts,—stating the date of the sale, the name and address of the purchaser, the name and quantity of the article sold, and purpose for which it is stated by the purchaser to be required.

The provisions of this section shall not apply to the dispensing of physicians' prescriptions; but all prescriptions shall be carefully filed by the pharmacist, and numbered in the order in which they are dispensed; such prescription must be preserved at least five years, and a copy must be furnished by the pharmacist if demanded by either the writer or the purchaser, for which copy no fee shall be exacted.

SEC. 11. This Act shall be known as the Pharmacy and Poison Act of 1871, and may always be so cited, described and spoken of.

### SCHEDULE A.

Aconite and its preparations; Arsenic and its preparations; Corrosive Sublimate; Cyanide of Potassium; Hydrocyanic Acid; Nux Vomica and its preparations; Opium and its preparations,—excepting paregoric and all preparations containing two grains or less of opium in one ounce; Strychnia and all poisonous vegetable alkaloids and their salts; Essential Oil of Bitter Almonds, of Pennyroyal, of Savine, of Tansy, and of Rue.

### SCHEDULE B.

Oxalic Acid; Sugar of Lead; Sulphate of Zinc; White Precipitate; Red Precipitate; Tartar Emetic.

### SCHEDULE C.

Belladonna and its preparations; Cantharides and the tincture; Chloroform; Cotton Root and its preparations; Croton Oil; Digitalis and its preparations; Ergot and its preparations; Henbane and its preparations; Chloral (Hydrate); Poison Hemlock or Conium; all Mineral Acids.

[We omit the remaining schedules, as they refer merely to the form of application for registration, to the certificate of qualification, &c.—*Ed, Pharmacist.*]

# EDITORIAL.

## "THE PHARMACY AND POISON ACT."

We print in this number of the PHARMACIST the draft of a law proposed by the druggists of this city, for enactment by the State Legislature at its present session. At a meeting of our druggists in February last, a committee, consisting of Messrs. Geo. Buck, Thos. Whitfield and E. H. Sargent, was appointed to prepare a law for this purpose. The draft was submitted at different times since, and carefully considered, amended, and finally adopted as expressing the opinion of those assembled, as to the restrictions necessary to be thrown around the delicate and responsible business of dispensing medicines for the sick.

While the prescribed regulations are no more strict than those common to all well regulated establishments at the present time, yet it will be safe to say that a vigorous enforcement of the law, if enacted, will do much to ensure a more competent class of dispensers than the majority of those now allowed to compound and dispense the most subtle remedies. To those who are competent, the proposed law has no terror, and it should be the aim of all who dispense medicines to become competent for the responsible duties they assume.

For the safety of the sick, our law-givers should not hesitate to enact all wholesome restraint possible. It is a matter in which every citizen must feel a personal interest, and while those who have drafted this law have less interest in its enactment than any other class in the community, they feel it to be a duty to place all the safeguards around the business that a proper regard for the value of human life inspires. In the performance of this duty, they have accepted as a necessity the registration of all who are now engaged in the business of selling medicines, whether qualified or not, deeming it unwise, if not impossible, to legislate any man out of his chosen calling; so far the public must be its own judge of who is capable. Hereafter no one can engage in the business until he has passed a satisfactory examination before a properly organized board of experts. This provision must insure a higher degree of attainment for the future.

To the general public this is of great value, while to the pharmacist it affords the prospect of seeing his honorable profession raised in the estimation of the community, and freed from the odium of justly charged ignorance and incapacity in many who pursue it as a business. We think the law is as good as can be enacted in this State at the present time; its provisions are not burdensome upon any; the fees are made as light as possible to defray the expenses consequent upon its enforcement; the sections relating to assistants, will prove a blessing to that numerous class, and as a whole we hope it will do much to elevate the practice of pharmacy, and to guard the lives and health of the public. We therefore commend the law to the favorable consideration of our pharmacist friends, and to the enlightened action of our legislature. We trust all who feel an interest in this reform will use their influence to secure its enactment at an early day, that no time may be lost in reaping its advantages.

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By an oversight in our last number, we failed to give credit to our valued contemporary, The American Journal of Pharmacy, for an article copied from its pages. We allude to that entitled, "On Sulpho-Carbolic Acid and the Sulpho-Carbolates," by J. Creuse. We regret exceedingly the omission, and hope our apology may be accepted.

Mr. Joseph Ince, F.R.S. of London, Eng., and Chas. R. C. Tichborne, M.R.I.A., F.C.S., of Dublin, Ireland, have been elected honorary members of the Chicago College of Pharmacy.

The following note has reached us:

EDITOR PHARMACIST—*Dear Sir:*—I have received the appended prescription, and not being able to understand it, or find the articles mentioned in the Dispensatory or botany, I submit it to you. It is a copy of a recipe sent to a person of our town by Joseph T. Inman, of New York, said to be a cure for nervous debility &c. If you can give me any light on the subject it will be thankfully received:

℞ Ext. Corvassa apimis, 1 ounce.
" Selarmo umbelifera, 4 drachms.
Powd. Alkermes Latifolia, 3 drachms.
Ext. Carsadoc Herbalis, 4 ounces.

The above named articles are said to be derived from herbs found in the Amazon valley, and through most valleys of the South American mountains. Their medicinal properties are said to be known to Indian Medicine men, and some missionaries of Europe who reside in South America. * * * *

We must confess our ignorance of the existence of the valuable articles of the materia medica mentioned by our correspondent; we fear the botanical names vegitated in the fertile brain of their proprietor, who applies them as "trade marks" to some common and well known drugs. He is evidently a disciple of the notorious Dr. James, whose sands of life it is to be hoped have now run out, and the Rev. J. H. Wilson, the retired clergyman, of "Ext. Blodgetti" fame. Their scheme of operation is a legitimate phase of the confidence game. Advertising (under the guise of charity) as specifics certain remedies which do not exist, or are not procurable, they announce that they will supply the article in a state of purity, &c., upon receipt of a certain price, which, of course, is enormous; by this means and the credulity of the public, they reap a rich harvest. The penalty of the extortion is perhaps not too much for those who are silly enough to be caught by such chaff, but the disappointed hopes which must follow, the delay of proper treatment,—to say nothing of the possible injurious effects of such remedies,—are the severest inflictions which their patrons must receive.

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BOOKS AND PAMPHLETS RECEIVED.—"Proceedings of The American Pharmaceutical Association, at the eighteenth annual meeting, held in Baltimore, Md., September, 1870. Also, the constitution and roll of members"—pp. 351. Sherman & Co., Printers, Philadelphia.

This volume, which we announced would be ready for delivery early in January, has just come to hand, owing to unavoidable delay on the part of the printers We are informed in the prefatory note by the chairman of the executive committee and the Permanent Secretary, that the proceedings might have been issued some four weeks earlier if the various reports had been at the disposal of the Editor at the proper time. It is very desirable to have the annual report follow as closely upon the meeting as circumstances will allow, and we think the Association, to avoid a source of frequent delay, should accept only such reports as are actually presented to the executive committee before adjournment. The interest in each meeting is naturally greatest at the time of its occurrence, and we believe many extra copies of the proceedings might be disposed of, if published sooner.

In looking over the present volume, we are impressed with the idea that it is lacking in the interest which usually attaches to the proceedings. This is due mainly to the indifference of members, who, accepting important positions, or queries for solution, fail to do the work rightly expected of them, or present reports which are but meagre apologies for what they should have been. There are some notable exceptions, as even the present volume will show, but it is too true that the majority of reporters entirely fail to satisfy expectations. We are pleased to notice that the Association thought proper to express a word of censure to such delinquents, in the following resolution, adopted without a dissenting voice:

"*Resolved*, That this Association views with regret the neglect on the part of the chairmen of committees to furnish reports, as also the failure of members to answer queries accepted by them, and hereby expresses its disapprobation of such neglect."

The volume before us contains nine special and eight volunteer reports and essays, some of which we present to our readers in this issue.

The report on the progress of pharmacy has of late years constituted one of the most attractive and valuable features of the proceedings, and hence we are wont to eagerly glance over this record of progress during the interval of a year. The compilation of a report satisfactory in every particular involves an immense deal of patient and conscientious labor, and the utmost familiarity with pharmacal literature, in order to properly discriminate between what is really new and valuable, and what appears simply in a new guise. In commenting upon the volume of 1869, we expressed our admiration for the thorough and masterly manner in which Dr. F. Hoffman, of New York, executed this labor, and we fear that, measuring the work of others by comparison, we will be doomed to frequent disappointment.

The report of Dr. Hoffman occupied one hundred and sixty-two pages of the proceedings, with scarcely a superfluous line devoted to any subject, while the report of the present volume covers but ninety-seven, and we cannot doubt that material is constantly increasing instead of diminishing. The chairman of the committee on the progress of pharmacy, in the remarks introductory to his report, alludes to its deficiencies, but refers in extenuation, to his continued ill health, which prevented the better accomplishment of the work. We have, however, a little additional fault to find with the reporter. First, he has seen fit to drop the established and valuable precedent of referring not alone to the journal in which a communication may have originally appeared, but to others, at least among American Journals, in which it may have been copied; and last, but not least, we must express our surprise that he has failed to allude to several important and valuable original communications published in THE PHARMACIST, and that, where he has found it necessary to give credit to the journal of the college with which he is connected, it is usually *via* some other journal, which has done us the honor to copy from our pages. Verily, a prophet is not without honor, save in his own country.

We observe a few verbal errors, due probably to inaccuracy of the phonographic report, and also some of a typographical nature, but we are aware how nearly impossible it is to entirely guard against them.

Though the proceedings for 1871 are not equal in interest to some of previous years, we can commend the volume as a valuable one, and well worth the price, $2.50, at which it is furnished to parties outside of the membership of the Association. It will be supplied on application, by Louis Strehl, 63 Randolph, State Agent, A. P. A.

"Report of the Board of Health of the City of Chicago, for 1867, 1868, and 1869, and a Sanitary History of Chicago from 1833 to 1870."

If any one doubted the importance of, indeed the necessity for, an efficient board of health in every large city, the doubt would be dispelled by an intelligent glance at the report before us. It is most valuable, not only from a sanitary, but also from a historical point of view, and bears evidence of the thorough and efficient manner in which the board of health of our city has dealt with the obstacles to public welfare.

We have received "The Year Book of Pharmacy," and "The Chemist and Druggists' Almanac and Diary," notices of which we are obliged to defer until our next issue.

## RESOLUTIONS OF RESPECT.

At a special meeting of the St. Louis College of Pharmacy, held at Polytechnic building, February 16th, the following proceedings were had, concerning the death of Mr. Eugene L. Massot.

The meeting was called to order by Mr. Wm. H. Crawford, and Mr. Hubert Primm was appointed Secretary. After remarks eulogistic of the deceased member's services and character, by Messrs. Alexander, Crawford, and Primm, the following resolutions were unanimously adopted:

"Whereas, The death of Mr. E. L. Massot having been announced to this College, we feel it our privilege and duty to give some expression to our deep sense of his loss, and our affectionate respect for his memory; therefore, be it

"*Resolved*, That we bear most willing testimony to his faithfulness and devotion in promoting the interests of this College, he being one of its most thorough friends, who at all times spared no trouble and thought—no labor too great to advance its interests. The records of this institution recite the confidence placed in him by its members. Filling successively the offices of President and Vice-President, he gave to each position that careful attention so necessary for the successful workings of such an institution as ours is. His blameless and consistent life, his amiable and genial disposition, and his eminently attractive social qualities, rendered his society sought for not only by members of his profession, but by all who came within the sphere of his acquaintance.

"*Resolved*, That we will attend the funeral, and cordially unite in every token of respect to his memory.

"*Resolved*, That a copy of these resolutions be presented to the family of the deceased, and that the pharmaceutical journals of the country, and the city press, be requested to publish the same.

"WM. H. CRAWFORD, *President*.

"Hubert Primm, *Secretary*."

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## MINUTES OF THE SEMI-ANNUAL MEETING OF THE CHICAGO COLLEGE OF PHARMACY.

Wednesday, P. M., March 8th, 1871.

The minutes of semi-annual meeting of Oct. 27th, 1870, and special meeting of Feb. 15th, 1871, were read; and, on motion, approved as recorded. The minutes of Trustees' meetings, held Oct. 27th, 1870, and Jan. 17th and Feb. 8th, 1871, were also read and approved.

The reports of the Standing Committees being called for no response was had from the Committee on Rooms and Library. Mr. Whitfield, chairman of Committee on Cabinet and Apparatus, read a lengthy report, showing that the cabinet contained specimens to amount of over 700, which had been placed in proper containers and mounted, and that want of sufficient room and time prevented the Committee from mounting such new additions as had been made since they filled their catalogue. On motion, the report was accepted and placed on file. In the absence of Mr. Buck, chairman of Committee on Examination, Mr. Ebert, a member of the committee, made a verbal report of their labors since the close of the session of the School of Pharmacy.

No report received from Committee on Finance, as the limits of the duties of this committee had not yet been reached.

Committee on Progress of Pharmacy—Mr. Hirsh, chairman—asked for an extension of time, which was granted.

Committee on Deceased Members—Mr. Hambright, chairman—reported the death of Mr. Arthur Rapleje, with an appropriate eulogy of this young and promising member. On motion, the report was accepted.

Committee on Lectures—Mr. Ebert, chairman—reported at length on the progress which had been made during the past winter. The Committee also suggested several necessary additions to the cabinets for lecture illustration, as well as means by which these deficiencies might be supplied. On motion, the report was accepted and placed on file.

The report of Committee on Selection of Rooms was deferred.

The Secretary's Report was then read, showing the whole amount of funds received since March 1st, 1870, to be $567.33; amount of funds not yet collected, $263.00; orders drawn on the Treasurer to amount of $699.26.

There were admitted to membership during the past year 10 members—2 foreign honorary, and 8 home members; 1 member resigned; 1 deceased. The roll at present contains 119 active, 3 associate, and 15 honorary members. Several suggestions were offered in regard to the more prompt and efficient collection of the revenues, as well as a proper disposal of delinquent members. On motion, the report was accepted, and suggestions laid over.

The Treasurer's Report was read, exhibiting cash on hand at beginning of year, $331.09; receipts for the year ending March 1st, 1871, $567.33; expenses, $694.26. The report was referred to the Auditing Committee.

The President read his Annual Address, which was received with applause.

### PRESIDENT'S ADDRESS.

GENTLEMEN, MEMBERS OF THE COLLEGE OF PHARMACY:

With the recurrence of our annual meeting is afforded an opportunity for us each to become aware of the condition and prospects of the College, and to inaugurate such changes as may be expedient. In briefly stating what seems to me necessary for promoting the welfare of the College, I can hardly fail to repeat suggestions heretofore made to you; for so doing my only excuse will be that a desirable result, although deferred, should not be forgotten.

Addressing you to-day, I presume for the last time, as your retiring President, I can but recall with emotions of pleasure the repeated expression of your confidence and esteem in calling me, for several successive years, to this honorable position. The pleasure is mingled with regret that I have not been more worthy of your preference, and that my well-intended efforts have not produced better results. I shall welcome my successor in office, trusting that what I have failed to accomplish, he may be able, with greater ability, to achieve. While we have partially failed in that we hoped for, yet the gratifying results so far realized should inspire us to increase our efforts, and untiringly pursue the objects of our organization. The encouraging success of this College, which has placed it in the front rank of similar institutions in this country, is due to the devoted energy of a few of its members; the many have been negligent of its best interests, and of their own duty toward it. I know that this is the experience of all similar organizations, but it is not the less censurable in our own. Complaint has been made in some quarters that a few persons manage and monopolize the College for their own benefit. Allowing it to be so—which is not the truth—I would ask whose fault it is, and how a change can be safely anticipated while so many remain indifferent and inactive? Instead of finding fault with the few who do work, let us all go to work earnestly and encourage each other by a helping hand, and by intelligent co-operation in whatever will promote our advancement. When each one shall do his duty, no one will be left to find fault, and the interest of each will increase with his labor for the common good. If faults exist, as doubtless they may, we can best correct them by kindly pointing out the error, and mutually aiding to overcome the difficulty. No attainable good can be had without a reasonable effort, and if we would enjoy any great blessing, we must first make it our own by appreciation. That which costs nothing is lightly valued, and this applies to intellectual no less than to physical matter.

When all our membership appreciate that the prompt payment of yearly dues is only the beginning of good works which should be followed by an earnest interest in and labor for the College, we shall attain to a degree of prosperity and usefulness not now imagined.

We have been favored by a kindly feeling among the members, and a freedom from the jealous business competition so often met with in other places. This friendly feeling should be cultivated, and ought to induce all pharmacists here to unite with us, and help to build up this College, as a bond of union for the business and professional advantage of each member. The pecuniary affairs of the College are in a healthy condition, as will be seen from the Treasurer's report. A balance still remains unexpended of the library fund, and it will be good policy to add some recent publications to our list of books. We should aim to make the library as complete as our resources will admit of. During the year past we have added but few and unimportant works, yet the collection is of great value, and worthy of our especial regard. The cabinet has received accessions, but has not been enriched as I hoped it would be during the year, owing in part to the lack of needed direction from the Committee, which direction is essential to success in this endeavor. This field for remunerative work is therefore open to us, and a reasonable effort will accomplish all we desire, in which I solicit the aid of all our friends.

The success of our lecture course is to some extent dependent upon the cabinet; at least the advantage to our students ought not to be lost sight of in the enhanced value given to oral instruction by ample illustration; neither should we depend upon our professors to supply the material for illustrating their lectures—as is too often the case in schools of this kind—when it is within our power to furnish all that is required. In securing apparatus we have been more fortunate, having by purchase and donation obtained many articles of value. Much more, however, is needed in this department, and I recommend that the Lecture Committee be requested to prepare a list of what is required, for immediate purchase. All the lectures given here should be amply illustrated, as the value of object teaching can hardly be over-estimated, making plain and easily understood what might otherwise be obscure. A liberal policy in this should be maintained, and this school be made as efficient as possible for instruction by the use of all the means within our reach. Some of the difficulties we labored under the past winter will be soon removed, and we may reasonably hope that with the experience gained, and with increased facilities for instruction, this school will be fully equal to any other in the system and quality of instruction given.

I deem it wise policy to offer every inducement possible for the young men of the west who wish to study pharmacy in this way, to come here. To this end I urge upon all of our members the duty of aiding your officers in obtaining employment for students, and in enabling your clerks to attend upon the lectures, such efforts will do much to increase the classes from year to year. The course of lectures just closed has been attended by a class of studious and intelligent young men, who we believe will continue their efforts to gain knowledge, and will influence others to follow their good example.

I ask your consideration of a system of instruction that seems to me judicious and wise, of giving each year a separate course of lectures to the junior and the senior class. I believe that more and better instruction can be imparted to each class, and that the range of knowledge we aim to impart will be more fully covered. While this course will be attended with more labor and demand a greater sacrifice of time by the teachers, the advantages to the taught will be sufficient in my judgment to warrant both. The time devoted to lectures by the student need not be increased; yet, if at leisure, he could attend both series of lectures with profit and without increased expense. Such a system for lectures will, I think, be adopted generally in medical schools, when the unreasonable competition now existing between such schools shall cease, and when a higher grade and greater quantity of knowledge shall be required of medical students to secure a diploma.

This system possesses the merit of greater thoroughness, subjects for study can be presented in better order, and be better adapted to the mind of the student at any stage of his orderly progression. Knowledge being of slow growth in the mind, facts should be presented as the mind can comprehend them, and it is an error to suppose that in many cases the mind of the student has been prepared to comprehend the more scientific or difficult portion of the lectures at his first entry to the school; experience does not warrant such a supposition, in this country at least.

As no instruction becomes knowledge until the receiver understands its truth, and makes it his own by intellectual effort, it is evident that the student should be taught by progressive steps, and not be forced to receive what his mind cannot digest. By the system usually adopted in schools of this class, the two courses of lectures are alike, and must needs be, if both classes are taught at the same time. It seems plain that if the lectures are adapted to the junior class, they cannot be suited to the senior; and if suitable for the senior class, they must be quite unfit for the junior. The most plausible reason for such a method of instruction would seem to be the indifference of the teacher to the welfare of the student, and that the lectures being above the comprehension of the junior, he must listen to the same in his senior year, when possibly from lack of suitable preparation the lectures are yet only instruction, and the *knowledge* must be obtained from subsequent study and experience. Such a system would hardly be acceptable to an intelligent Board of Education for teaching other branches of study.

I know it is argued that College lectures are only to instruct the student how he may obtain knowledge, but if that is all we aim to do, why do we grant a diploma as for knowledge *acquired?*

Would it not be well, in the infancy of this school, to pursue a different course? Not for innovatian sake, but in a desire to do the *best* we can, even if it prove an innovation on time-honored custom.

The publication of THE PHARMACIST has been continued without interruption, and it has proved to be a valuable auxilliary to the College. The success attending it, both in a scientific and in a pecuniary view, has been encouraging. The Publishing Committee continue their unwearied exertions in its behalf, without which it would long since have ceased to exist. The personal devotion and energy of Mr. Whitfield in its business management, deserves our warmest acknowledgment and thanks. May we long be favored with his valuable services, which, being untold, are likely to be unappreciated.

It will be necessary to decide very soon upon a permanent home for the College, and a committee will report to-day on the subject. It will demand your serious consideration, on account of the varied interests involved, which are daily becoming more serious and important. A committee appointed by the trustees, prepared a draft of a law for regulating the practice of pharmacy in this State, which was subsequently submitted to a very full meeting of the druggists of this city, and after some changes was unanimously approved. It has been submitted to the Legislature for its action. This is a matter in which we all feel a deep personal interest, and we may hope that very soon it will be defined by law who can and who cannot practice pharmacy in our midst.

With this imperfect sketch of our affairs, I resign the official position you so generously bestowed upon me. In thanking you, I must not omit to thank my brother officers who have treated me so kindly, and who have served the College so faithfully as to leave no cause for regret or pain.

May we all live to meet again on our next anniversary, and in the years to come strive by united and harmonious action to extend the benefits and usefulness of our beloved College. E. H. SARGENT.

On motion, a unanimous vote of thanks was tendered to the retiring President for the faithful manner in which he has presided over the College.

The College proceeded to an informal ballot for election of officers for the ensuing year—Messrs. Jamieson and Wilson acting as tellers. After repeated ballots, and prevailing motions for the unanimous choice of several of the nominees, the following result was reported, viz.:

E. H. SARGENT, President.
JOHN W. EHRMAN, 1st. Vice-President.
E. THEO. SCHLOETZER, 2d Vice-President.
A. C. VANDERBURGH, Treasurer.
GEO. M. HAMBRIGHT, Secretary.
ALBERT E. EBERT, Corresponding Secretary.

*Trustees*—Geo. Buck, Thos. Whitfield, Wm. F. Blocki, Jos. M. Hirsh, Theo. H. Patterson, N. Gray Bartlett, Henry Biroth, Henry Sweet, Thos. Jamieson, Julius H. Wilson.

On motion, the sum of $200 was appropriated for current expenses.

The Secretary's suggestions, set forth in his report, were called up, when a motion prevailed that "The disposition of delinquent members be left to the Board of Trustees, with power to act."

Messrs. Blocki, Ebert and Whitfield, the committee on New Rooms, made a verbal report, which elicited considerable discussion; when, on motion, Messrs. Sweet, Biroth, Hambright, Bartlett, Sargent and Wilson, were added to the Committee, with instructions to report at a meeting of the said Committee, to be held Wednesday, March 15th, at 3 p. m.

On motion to adjourn, adjourned.

GEO, M, HAMBRIGHT, *Secretary.*

THE PHARMACIST

AND

CHEMICAL RECORD.

VOL. IV. CHICAGO, APRIL, 1871. No. 4.

# THE CRYSTALLIZATION OF CAMPHOR.

BY R. ROTHER.

The peculiar predilection of camphor for the crystalline form, is one of the petty annoyances inherent to the dispensing department. Insignificant as the objection may seem, it is nevertheless one for which the dispensing pharmaceutist is but too willing to accept a remedy. This difficulty is chiefly experienced with powdered camphor, but the objection, likewise, though in a less obvious degree, applies to the aqueous solution. The most perfect means of pulverizing camphor, although not the most practicable, is undoubtedly the method by precipitation. The trituration with small quantities of chloroform, ether, benzine, and naphtha, has been proposed; but none of these substances possess any advantages over alcohol, which even still is preferable to all. There is no difficulty, whatever, in pulverizing camphor: the object is to retain it so.

For this purpose it has been suggested to triturate the camphor with small quantities of magnesium carbonate. If this management insured the pulverulent state indefinitely, the magnesium would often be objectionable. The writer has not tested the process, but was informed by good authority that it is not satisfactory; a similar result is experienced by precipitating the camphor with water from an alcoholic solution, holding the magnesium carbonate in suspension. Other dry substances, as starch, for instance, have been used with equally indifferent success. The writer, feeling the necessity of some alternative, and basing his theory of this crystallization upon the volatility of camphor, applied an etherial solution of resin with a view of coating the particles with a deposit of resin. The experiment, however, yielded a negative result. The writer, assuming then that a non-volatile solvent might retard the crystallization, employed a small proportion of fixed oil—preferably castor oil. This addition is entirely unobjectionable, and although it does not strictly meet the most sanguine expectation of preventing crystallization, it yet modifies this tendency to such a degree that after a long trial the writer is so thoroughly satisfied with its peculiar advantages that the complete success of the experiment would have been scarcely hailed with more delight. The proportion of castor oil employed is about one part in thirty of camphor, or even less. It is added, together with the alcohol, to the camphor, and the whole triturated to the proper degree of fineness. The great advantage rests in the fact that the crystals of camphor subsequently formed are exceedingly minute, and that the oil entirely removes the very disagreeable adhesiveness and tenacity of the camphor, which becomes so troublesome during the trituration of pure camphor. Camphor containing the oil can be triturated in large or small quantities, without in the least clogging the mortar or pestle. The powder, after keeping even a long time, mixes perfectly and with facility with all the ordinary ingredients with which it is usually combined in prescriptions. The peculiar gumminess has been perfectly removed by the intervention of the oil.

The aqueous solution of camphor is another point at issue. It has been supposed that during cold weather camphor water drops part of its camphor. However, this phenomenon is only apparent. The writer has often been struck by the extraordinary solvent power of very cold water upon camphor, so that during the coldest winter weather the cold water drawn fresh from the hydrant, and having a very low temperature, always yielded the strongest camphor water, which, when subjected to the warm temperature of the room, deposited camphor abundantly and in weighable quantities, not upon the glass above the liquid, but floating in beautiful crystals in the liquid itself; so much so that the water was often filtered again before use.

To verify the above conclusion, the writer employed lukewarm water. The camphor was first finely triturated with the aid of alcohol, then with the magnesium carbonate, first rubbed through a coarse seive, then with a portion of the water, and poured into a capacious bottle; the remainder of the water was then gradually added, and the mixture violently shaken during the intervals, and finally filtered. (This is essentially the writer's manipulation for the aromatic waters.) The bottle containing the filtrate was securely corked and allowed to cool. After six hours a very thin film of crystalline camphor had deposited on the walls of the bottle above the liquid, the latter containing no visible trace, not even floating upon the surface. The liquid was again filtered and exposed to intense cold for a long time, but no more camphor separated, although the liquid possessed the taste of camphor in a marked degree. Therefore, to make camphor water, free from separated camphor, use lukewarm water, or use water of the ordinary temperature, let it become equalized to the temperature of the room, and after a repose of twenty-four hours, filter. But to make a supersaturated camphor water, employ water having a very low temperature.

# UNOFFICINAL FORMULAS.

BY CHAS. FREDIGKE.

*Unguentum Acidi Carbolici.*

Simple Ointment, benzoated, 4 pounds troy.
Carbolic Acid, crystallized, 3 ounces, 96 grains.

Liquefy the acid by immersing the vessel containing it in hot water, and when the ointment is about congealing, add the acid, stirring well with a strong wooden spatula.

Each drachm contains three grains.

This ointment has been of excellent service in treating large superficial wounds, and ulcerating surfaces caused by burns, and in cutaneous eruptions of a parasitic nature.

*Liquor Sedativus.*

Tinct. Opii Camphor.
Spts. Æth. Nit. dulc.
" Mindereri.
Syr. Simpl.
Aq. Camphoræ, a. a. part aeq.

M. et ft. solutio. Dose: A teaspoonful.

To increase the therapeutic effect of this mixture, 2 fl. ʒ. of Tinct. Gelsemini, or 1 fl. ʒ of Tinct. Verat. vir. are often added to four ounces, to meet particular indications. This is a combination often prescribed in diseases complicated with febrile symptoms.

*Extractum Fabœ Calabariensis.*

Calabar Beans, 1,000 grammes.
Alcohol of 0.864, 5,000 "

Reduce the beans to a fine powder, digest with a litre of alcohol over a water-bath, which must be maintained at a gentle heat for two hours. Then introduce the mixture into a displacement cylinder, and when the liquor, which results from this digestion, ceases to run, pour over the powder a second litre of boiling alcohol, and continue in this manner till the liquor passes off colorless. Mix the solutions, distil off the greater portion of the alcohol and evaporate over a water-bath to the consistence of an extract. It is necessary to stir constantly towards the close of the operation, in order to render the product homogeneous.

1,000 grammes of Calabar beans furnish from 25 to 30 grammes of extract, having a pilular consistence.

The above is the process for the preparation of this extract adopted by the French Pharmacopœia.

*Emplastrum Vesicans Mediolanense.* Milanese Flies. (Mouches de Milan.)

Burgundy Pitch, purified,
Yellow Wax,
Spanish Flies, powdered, of each 50 grammes.
White Turpentine, 10 grammes.
Oil of Lavender,
" " Thyme, of each, 1 gramme.

Melt the two first substances together, add the flies and digest over a water-bath for two hours, after which add the turpentine, and when that is dissolved, remove the vessel from the fire, taking care to stir continually till the mass is half cooled down, then aromatize with the volatile oils.

When specially indicated, dispense this plaster divided into small flattened balls weighing one gramme, wrapped into a piece of black taffeta 6 centimeters (2⅜ in.) in diameter, folded upon itself. The plaster is spread out upon this when used.

This elegant form of dispensing Empl. Cantharid. is common in France, although it is one of those preparations the keeping on hand of which is not made obligatory on French apothecaries by their pharmacopœia.

CHICAGO, March, 1871.

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## SAPONIFIED COD-LIVER OIL.

Prof. Van den Corput, of Brussels, recently published a paper directing attention to the great advantages to be derived from the use of cod-liver oil saponified by lime in the treatment of phthisis. The principal advantages claimed by Dr. C. for this preparation are its solid form and its slight and not disagreeable taste; its consequent easier ingestion and assimilation, and its freedom from tendency to produce the diarrhœa so often caused by cod-liver oil as generally given.

The author's formula for the soap is: one hundred parts of pure cod-liver oil are saponified into a pilular consistence by means of hydrated lime, and then aromatized by one part of bitter almond or anise essence. This mass is divided into boluses of five or six grains each, sugar-coated, and covered, if desired, by ethereal tincture of tolu. Of these, two are a dose, taken from three to five times a day. Given early in phthisis, Dr. C. claims that it often retards the progress of the affection, and sometimes leads to cure.

The soap as prepared above has been found by physicians of this city exceedingly offensive. The specimens that the writer has seen are simply disgusting. On inquiry made of one of our leading pharmaceutists, C. Lewis Diehl, as to the probable cause of this nauseous odor of the compound, we received the accompanying note, the publication of which may save some of our readers from disappointment in the preparation of Dr. Van den C.'s pills:

LOUISVILLE, February 15, 1871.

*Editors American Practitioner:*

The process of Prof. Van den Corput for pills of cod-liver oil is not available for general use, because he only indicates the composition of the pills instead of giving a working formula. The saponification of cod-liver oil by means of lime is effected by boiling the oil with milk of lime for an hour or two, according to circumstances. By using just sufficient, or an excess of lime, *perfect* saponification results, and a hard, brittle, and insoluble soap is formed. As Professor V. d. C. speaks of saponifying the oil to a pilular consistence, it is evident he intends *partial* saponification; and, accepting this view, I attempted the preparation of the pills. Pure cod-liver oil, as nearly odorless and tasteless as the best oils in our markets are found, was boiled with a sixteenth of its weight of lime, in form of dilute milk of lime, for nearly two hours. When cool, the partially saponified oil floated upon the surface of the watery liquid, and had acquired about the consistence of lard. Evidently this consistence was not that required, and more lime should have been employed to bring the oil to the proper consistence. The experiment was, however, not continued, as the extremely nauseous odor arising during the saponification, and retained by the saponaceous mixture, gave plain indication of the formation of products of decomposition, among them propylamine, which in their character gave sufficient reason for discarding the process from a pharmaceutic point of view. Whether the therapeutic value of cod-liver oil is thereby affected must be determined by the physician.

Very respectfully, C. LEWIS DIEHL.

—*The American Practitioner.*

## THE COMPARATIVE EFFICACY OF ANTISEPTICS.

Dr. F. Crace Calvert has performed two series of experiments in order to ascertain the comparative powers of various substances ordinarily used as antiseptics. The first consisted in placing in bottles (not corked) solution of albumen and flour-paste. To these he added various proportions of some of the substances patronized at the present time as antiseptics, and the following table shows the time in which an offensive odor became sensible at a temperature from 70 to 80 degrees F.:

| Antiseptic employed. | Per cent. of antiseptic. | Albumen. | Flour-paste. |
|---|---|---|---|
| M'Dougall's disinfecting powder | 5 | 11 days | 25 days. |
| Carbolic disinfecting powder.. | 5 | Sound | Sound |
| Chlor-Alum (made lately)...... | 2 | 9 days | — |
| Chloride of zinc.............. | 2 | 15 days | — |
| Chloride of lime.............. | 5 | 16 days | 14 days |
| Permanganate of potash....... | 5 | — | — |
| Tar oil....................... | 2 | 11 days | 25 days |
| Carbolic acid................. | 2 | Sound | Sound |
| Cresylic acid................. | 2 | Sound | Sound |
| None......................... | — | 5 days | 7 days |

The above table he considers clearly to show that the only true antiseptics are carbolic and cresylic acids; and these results coincide with those obtained by Mr. William Crookes, F.R.S., Dr. Angus Smith, F.R.S., and Dr. Sansom. These two acids continued their action till the albumen solution and paste dried up. The second series had the object of ascertaining which of the undetermined substances is most active in destroying germs, and preserving animal substance. At the bottom of wide-mouthed pint bottles, Dr. Calvert placed a known quantity of each of the antiseptics, suspending over them by a thread a piece of sound meat; and, by daily examination, it was easily ascertained when the meat became tainted or putrid.

| Antiseptic used. | Became tainted. | Putrid. |
|---|---|---|
| Permanganate of potash | 2 days | 4 days |
| Chlor-Alum | 2 “ | 10 “ |
| M'Dougall's disinfecting powder | 12 “ | 19 “ |
| Chloride of lime | 14 “ | 21 “ |
| Tar oil | 16 “ | 25 “ |
| Chloride of zinc | 19 “ | — |
| Carbolic disinfecting powder | Did not become tainted, but dried up and became quite hard. | |
| Carbolic acid | | |
| Cresylic acid | | |

—*British Medical Journal.*

## PRESERVATION OF VACCINE CRUSTS.

BY DAVID STEWART, M. D.

Vaccine lymph may be preserved during all the summer months, in any climate, by the following expedient, which I devised several years since:—Immerse them in mercury, and keep the package in a cool cellar, or ice-house or well. No moisture can reach them, although the package is placed beneath the surface of water in the well, or sunk to the bottom thereof. Moreover, they will be dried more thoroughly when deeply imbedded in water, for manifest reasons, and not only protected from insects, but the peculiar animal, which forms at their expense (invariably when they are otherwise stored away), and equals them in size ultimately, will not occur.

In 1868, I preserved them thus successfully, in my cellar, from the spring until autumn, by attaching a slice of cork to a thread, which facilitates its removal from a tube vial or “test-tube,” when forced down and confined by its own elasticity to the lower extremity; this slice of cork I marked with the date, &c., and then dropped upon it some melted beeswax, one drop of which is sufficient to attach the crust to one side of the disc of cork which suspends it, clear of the glass at the bottom, under a stratum of mercury which may be subsequently introduced until the tube is filled; but one inch of mercury I prefer, although much less may answer, provided the cork is covered therewith; especially if (by the mouth) the pressure of the atmosphere is partly removed (sucked out) from its surface momentarily, as this is *more* than equivalent to the effect that would otherwise result if even twenty (20) inches of mercury were imposed. In other words, the vaccine is enclosed in a *quasi* Torricellian vacuum; and, moreover, any air on its surface is expanded and escapes above the stratum of mercury. Upon this principle, delicate anatomical preparations may be kept during the summer months in their original perfection, provided eremecausis has not commenced.—*American Journal of Pharmacy.*

PORT PENN, Del., June 9, 1870.

# SOLUTION OF SANTONINE.

BY JOHN HARLEY, M. D., LOND., F. R. C. P., ETC.

The insolubility of this vermifuge impairs its utility. Cold or warm water takes up the merest trace. Chloroform, absolute alcohol, the strongest acetic acid, turpentine, hot olive oil, and hot glycerine, are the only simple fluids that dissolve any appreciable quantity. On cooling, it separates from the oil and glycerine; and the addition of water to the other solvents produces the same result.

It is obvious, therefore, that none of these solvents are adapted for the use of Santonine as a medicinal agent. A wish to determine the effect of Santonine in parasitic disease of the bladder led me, after a good deal of trouble, to find that I could form a suitable stronger solution than was needed for my purpose by means of carbonate of soda. I may formularize my results thus:—

℞ Santonini, in pulvere, gr. xij.
Sodæ bicarbonatis, gr. xx.
Aquæ distillatæ ℥ iij.

Put the soda and water into a flask, keep the fluid near the boiling-point, adding, as it disappears, about two grains of the Santonine at a time, until the whole is dissolved. Solution is effected in about half an hour, during which time the water is reduced to ℥ ij. If need be, reduce by boiling to this bulk, when ℥ j will contain a full dose—six grains of Santonine. If an alkaline reaction be objectionable, neutralize with acetic acid.

*Characters of the Solution.*—Bright and permanent, strongly alkaline, free from odor, and excepting that of carbonate of soda, of taste. Carefully neutralized with acetic acid, an equally bright and permanent neutral solution is formed. Both the alkaline and neutral solution may be diluted to any extent with either cold or hot water, without impairing the perfection of the solution of the Santonine. Excess of acetic acid, after some hours, and the mineral acids immediately precipitate the whole, or nearly the whole of the Santonine, unchanged and in its original form of colorless, rectangular plates with bevelled edges.

*Use.*—By the process above described we obtain a bland *alkaline solution*, so completely void of irritating qualities that it may be dropped into the eye without causing the least sensation; and a *neutral solution*, for use in those cases in which an alkali would be unsuitable.

Mixed with from one to twenty times its bulk of acid urine, sp. gr. 1017·5, and containing excess of uric acid, and retained at 100° Fahr. for several hours, not the faintest turbidity is produced, unless in the case of the alkaline solution, and an excess of phosphates in the urine, when a faint cloudiness may occur from the separation of the latter.

This proves that excess of acid urine (uric acid) fails to cause a deposition of Santonine.

As an injection, from ℥ ss to ℥ j (three to six grains) of either solution may be mixed with three or four ounces of warm water, and passed into the bladder or rectum.

I have already shown that absorption is readily effected by the mucous membrane of the bladder;[1] and therefore general as well as topical effects may be expected when Santonine is introduced by this channel.

In cases where powders are objected to, a pleasant mixture may be made by adding a little syrup and flavoring water to the Santonine solution.—*London Practitioner.*

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[1] See my last communication to the Medico-Chirurgical Society on the Endemic Hæmaturia of the southeast coast of Africa.

# TEST OF THE PURITY OF WHITE LEAD.

BY FELIX M'ARDLE,

*Analytical Chemist, St. Louis.*

The following is an infallible and simple commercial test of the purity of White Lead:

Take a piece of firm, close-grained charcoal, and near one end of it scoop out a cavity about half an inch in diameter and a quarter of an inch in depth. Place in the cavity a sample of the Lead to be tested, about the size of a small pea, and apply to it continuously the *blue* or *hottest* part of the flame of the blow pipe; if the sample be strictly pure, it will in a very short time, say in two minutes, be reduced to Metallic Lead, leaving no residue; but if it be adulterated, even to the extent of ten per cent. only, with oxide of zinc, sulphate of baryta, whiting, or any other carbonate of lime, (which substances are now the only adulterations used,) or if it be composed entirely of these materials, as is sometimes the case with cheap lead, it cannot be reduced, but will remain on the charcoal an infusible mass.

Dry White Lead (carbonate of Lead) is composed of metallic lead, oxygen and carbonic acid, and when ground with linseed oil forms the White Lead of commerce. When it is subjected to the above treatment, the oil is first burned off, and then, at a certain degree of heat, the oxygen and carbonic acid are set free, leaving only the metallic lead from which it was manufactured. If, however, there be present in the sample any of the above mentioned adulterations, *they* cannot, of course, be reduced to metallic lead, and cannot be reduced by any heat of the blow pipe flame to their own metallic bases; and being intimately incorporated and ground with the carbonate of lead, they prevent *it* from being reduced.

It is well after blowing upon the sample, say half a minute, by which time the oil will be burned off, to loosen the sample from the charcoal, with a knife blade or spatula, in order that the flame may pass under as well as over and against it. With proper care the lead will run into one button, instead of scattering over the charcoal, and this is the reason why the cavity above mentioned is necessary. A common star candle or a lard oil lamp furnishes the best flame for use of the blow pipe; a coal oil lamp should not be used.

By the above test, after a little practice, so small an adulteration as one or two per cent. can be detected; it is, however, only a test of the *purity* or *impurity* of a lead, and if found adulterated the degree or percentage of adulteration cannot be well ascertained by it.

Jewelers usually have all the necessary apparatus for making the test, and any one of them can readily make it by observing the above directions, and from them can be obtained a blow pipe at small cost.

If you have no open package of the lead to be tested, a sample can most easily be obtained by boring into the side or top of a keg with a gimlet, and with it taking out the required quantity; care should be used to free it entirely from the borings or particles of wood, and it should not be larger than the size mentioned; a larger quantity can be reduced, but of course more time will be required, and the experiment cannot be so neatly perfomed.

Although the above description is necessarily somewhat lengthy, this test is really very simple, and any one can very soon learn to make it with ease and skill.—*Collier Co.'s Circular.*

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## CASTOR-OIL SOAP.

BY F. M. RIMMINGTON.

It is somewhat remarkable that our present English pharmacy has no pure medicinal soap possessing any characteristic property or medicinal activity. The ordinary Castile soap, being that which is commonly used for that ordered by the Pharmacopœia, can scarcely be considered a satisfactory article when we consider its composition and the mode of its manufacture. Having recently had occasion to direct my attention to this subject, it occurred to me that castor-oil offered some advantages, and would yield a soap possessing qualities very desirable in an article which so frequently formed the medium or adjunct for administering other active remedies. On putting this idea into practice, I found that a soap prepared from this oil has rather marked qualities, but my opportunities do not afford me the means of properly testing its medicinal properties. I believe it will be found that it has sufficient aperient power to relax the bowels when taken consecutively for several days, but I believe its greatest value will be found as an adjunct to other aperients. This at least is the result I have arrived at. It is, of course, well known that the purgative principle of castor-oil has been ascribed by Soubeiran to the existence of a supposed oleo-resin, and that the ricinoleic acid is extremely acrid. I find when the oil is saponified that this acrid principle is either entirely or partially liberated, and does not continue masked as it is in the oil in its natural state, nor neutralized, as might be expected, by the alkali. It is to this fact, I think, we must look for any active property this soap may possess; and here I must leave the matter for the further investigation of the medical and pharmaceutical professions. The physical properties of the soap are in its favor for use in medicine. It has a clean, yellowish-white color, is free from smell; it soon becomes dry, hard, and is easily powdered; it has no tendency to soften or deliquesce on exposure to the air. In proof spirit it makes a perfectly clear and colorless solution, with only little sediment. I shall forward a specimen to the Society for the inspection of those who may feel interested.—*Pharmaceutical Journal*, *London.*

## REDUCTION OF NITRATE OF SILVER BY CHARCOAL.

When solid nitrate of silver, either in crystals or sticks, is placed upon glowing charcoal, deflagration takes place, the silver being left in the metallic state, while binoxide of nitrogen and carbonic acid are evolved. The nitrate is fused by the heat of the reaction and sinks into the pores of the charcoal, and as each particle of charcoal is replaced by metallic silver, the structure of the original wood is preserved. With proper management, pieces of silver of any desired size can be prepared showing the exact structure of the wood. A crystal of nitrate is placed on the end of a piece of charcoal, and the blowpipe flame is directed upon the coal near the crystal to start the reaction. When deflagration begins, crystal after crystal may be added. The nitrate fuses, passes down through the porous metal already reduced until it reaches the glowing coal, where it is reduced. I have prepared in this manner lumps of silver weighing an ounce or more, which exhibit most beautifully the rings of the wood.—C. F. CHANDLER.—*American Chemist.*

## SULPHETHYLATE OF SODA.

It is very well known that alcohol ($C_4 H_5 O. HO$) combines with two equivalents of sulphuric acid to produce sulphethylic or "sulphovinic" acid ($HO. C_4 H_5 O\ 2SO_3$)—a compound having the elements of a double sulphate of ether and water, or of a bisulphate of alcohol. It is owing to the instability of this acid at its boiling point, that ether is evolved from it, above 280° F., in the ordinary process of ether manufacture. Sulphethylic acid may be prepared by adding stronger alcohol to an equal measure of sulphuric acid, keeping the heat due to combination below 260° F., then for a short time maintaining the full heat of a water bath, and leaving at ordinary temperature for twenty-four hours. The larger portion of the alcohol combines, and a portion of the sulphuric acid remains uncombined. If now baryta of consistence of cream be carefully added to the neutral point, there will be produced soluble sulphethylate of baryta, along with the insoluble sulphate of baryta, which may now be removed by filtration. To the neutral filtrate there is now added solution of sulphate of soda, as long as a precipitate is produced:

$$BaO.\ C_4 H_5 O\ 2SO_3 + Na\ O.\ SO_3 = \mathit{BaO.\ SO_3} + NaO\ C_4 H_5 O\ 2SO_3.$$

The filtrate, concentrated, crystallizes in deliquescent hexagonal scales,—the salt named at the head of this note,—and to which our attention is called by a statement very favorable to its therapeutical value, from Dr. Rabutau, reported in a recent number of *Schmidt's*

*Jarbuecher*. From a series of experiments, both on animals and on the human system, the following results are presented:

The *taste* of sulphethylate of soda—pleasantly saccharine and slightly saline—is relished by children and fastidious persons.

It is the *mildest* of saline purgatives, and for colic is of itself a sufficient and ready remedy.

It *does not cause pain* or abnormal contraction of the colon; produces soluble discharges; and may be given during the menses and during pregnancy.

In effect, it is the *citrate of magnesia* of purgatives; with the additional advantages of a more agreeable taste, and of not endangering the formation of cystic calculi, when long employed.

It operates in relatively small *doses:* as a purgative, 25 grammes (386 grains) in a large draught of water, suffice for adults—with persons very easily affected, producing five or six stools.

A *diuretic* action is produced by five grammes (77 grains). Its renal excretion is very rapid; so that on the day after administration, the urine contained but traces of the salt. The urinary constituents remained in normal proportion.—*Michigan University Journal.*

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## PREPARATIONS OF CONIUM: THEIR CHARACTERS AND MEDICINAL VALUE.

BY JOHN HARLEY, M. D.,

In an able and exhaustive paper in the December number of the *Practitioner*, Dr. Harley records the results of a continuation of his researches upon the comparative value of the different preparations of *Conium*. Although written principally for the information of the medical practitioner, it has considerable interest for the pharmacist.

Dr. Harley is of opinion that the only reliable test of the amount of active principle in a preparation of hemlock is physiological action, the alkaloid being so subtle and unstable that chemical reagents used for the quantitative determination of conia, when combined with the ordinary constituents of vegetable infusions, give most fallacious results. He says that any one acquainted with the physiological effects of conia may easily determine its amount by subjecting a nervous system of known power to its action, an experiment for which an hour will suffice.

Schroff has recently stated that the unripe fruit of one-year conium plants contains the smallest amount of conia; that the unripe fruit of biennial plants contains the most conia, especially when the development of the fruit is advanced and near ripening; that the perfectly ripe fruit, produced only by the biennial plants, stands in point of efficacy between these two. Dr. Harley says that he does not quite agree with all these particulars. He has found that conia stands to the ripe and unripe fruit pretty much in the same relation as opium does to the ripe and unripe fruit of the poppy. It abounds in the green pericarp, but gradually decreases as this becomes dry and brown. As to the statement that only biennial plants produce perfectly ripe fruit, he says that for four years he has kept up a little plantation of annual hemlock plants derived from the self-sown seed of a previous generation of annual plants.

Dr. Harley draws the following conclusions from his experiments:

That the superiority of the green fruit over every other part of the plant, as the basis of the tincture and extract, is clear and decided. He considers the Pharmacopœia extract to be a scandal to the present state of medical knowledge, and that as soon as possible a spirituous extract of the green fruit should take its place.

That although the variability in strength of the succus is a drawback, this might be in great measure removed by the cultivation of the plant for medicinal use. At present the wild plant is gathered as soon as it makes the least show of flowering, instead of being allowed to remain until the fruit begins to form.

Another grievance is the expensiveness of the succus. With the following remarks on this point Dr. Harley concludes his paper: "This is a discredit to pharmacy, for hemlock is the rankest of our native weeds, and by an abundant yield of juice would well repay the room required for its growth; cultivation it requires none. If our pharmaceutists remain blind to their interests, medical men must help themselves, and annually rear a dozen plants in some waste spot of their garden. These will yield them a pound of green fruit, from which, with a very little trouble, may be made a tincture stronger than any juice that can be produced, and an extract, of which three grains would produce decided effects in most persons.—*London Pharm. Journal.*

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## THE REACTION OF POTASSIC IODIDE WITH THE OFFICINAL TRISNITRATE OF BISMUTH.

BY W. BATHURST WOODMAN, M. D., AND C. MEYMOTT TIDY, M. B.

An out-patient attending at the London Hospital was taking the bismuth mixture of its Pharmacopœia, when it was thought advisable to add iodide of potassium to the previous prescription. When she came the following time, she appeared much alarmed at a red precipitate in the mixture, which she supposed to be "red lead," purposely put in by some neighbor, the sediment having been almost colorless when she reached home. As no mention is made in the ordinary text-books of materia medica of the decomposition which takes place, although it is doubtless well known to metallurgists, it occurred to the authors to examine the reaction a little more closely. The change takes place slowly, and appears to consist in the formation of an iodide of bismuth, potassic nitrate, remaining in solution. This iodide of bismuth is a dark-red substance of cubic form, and seems to be a simple iodide, which is almost insoluble both in water and in excess of potassic iodide. Some of its properties are curious. It is a very insoluble substance; for, in addition to what is mentioned above, we may add that saturated solutions of chloride of ammonium, chloride of sodium, ferrocyanide of potassium, and corrosive sublimate, do not dissolve it in any appreciable proportions. Acetic acid dissolves it slightly, without effervescence. On boiling with liquor potassæ or ammonia, the hydrated oxide of bismuth ($HBiO_4$) is produced, which is insoluble in excess of either reagent. On treating this iodide with strong nitric acid, there was active effervescence; fumes of iodine being given off, a blackish metallic-looking substance being left, entirely soluble in spirit, which proved to be pure iodine. Acid nitrate of bismuth remained in solution which was not precipitated by a small quantity of water, or until neutralized. With hydrochloric or sulphuric acid there was no effervescence, but iodine was again precipitated; with the latter some iodic acid was formed. Oxalic acid also decomposed the salt, setting free the iodine; the action being somewhat slower than it was in the case of the mineral acid.

A few trials of it in doses of 5 to 20 grains appeared to indicate that it is not an energetic therapeutic agent, which is probably to be ascribed to its comparative insolubility.—*British Medical Journal.*

## UNWHOLESOME CANDIES.

Hermann Endemann, Ph. D., Assistant Chemist to the Health Department of New York, has recently examined a great variety of candies, collected from various dealers by Drs. Leo and Frankell, Assistant Sanitary Inspectors.

*Inorganic adulterations* were detected in only two cases, in both cases in lozenges, to the extent of three and six per cent. In one establishment visited a white powder was obtained, which proved to be gypsum, sulphate of lime.

*Coloring matters.*—Reds were either carmine or aniline red, both harmless.

Blues were either ultramarine or Prussian blue, both harmless.

Yellows were either saffron, chromate of lime, chromate of baryta, chromate of lead, gamboge, or yellow vegetable colors precipitated by alum and chalk.

Of ten samples examined, five were colored with chromate of lead and one with gamboge, both of which are poisonous.

Greens were found to be harmless.

*Flavors.*—Oil of peppermint is often adulterated with oil of turpentine. The other flavors are generally artificial ethers, as, for example, butyric ether. Many of these are considered injurious.

*Substitutes for sugar and gum arabic.*—Glucose, starch sugar, is common in some kinds of candy. Starch is extensively used as a substitute for the more expensive gum arabic. Both of these substances are harmless.

*In conclusion*, the public is cautioned against highly colored yellow, orange, and green candies, and against highly flavored candies.—*American Chemist.*

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THE POISONOUS DOSE OF CHLORAL.—Two remarkable instances of very large doses of chloral being taken with only transient effect have come under our notice within the last two months, and singularly enough, in the same house. A lady was attacked with acute mania; sleep could only be procured by chloral, and a mixture was provided, of which four tablespoonfuls (containing 30 grains) were to be taken every night. Against the plainest orders, the attendants gave four times this quantity (containing 120 grains), one night. Continuous sleep for twelve hours followed, but no evil effects occurred. Singularly enough, the husband of the lady was attacked with delirium tremens, and took, by mistake, either 150 or 180 grains of chloral. He slept continuously for about twenty-four hours, and even after this could only very gradually be roused—falling asleep in walking, and even on horseback. But his delirium tremens was cured.

On the other hand, we must never forget that some patients are much more sensitive: as *e.g.* the patient mentioned by Dr. Reynolds in the *Practitioner* some time ago, who nearly died from a dose of 50 grains. It is never safe to commence with doses of more than 30 grains.—Ed. Pract.—*Practitioner.*

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Method of Tinning Copper, Brass, and Iron in the Cold and without Apparatus.—F. Stolba.—The requisites for accomplishing this object are: 1st. The object to be coated with tin must be entirely free from oxide. It must be carefully cleaned, and care be taken that no grease-spots are left; it makes no difference whether the object be cleaned mechanically or chemically. 2d. Zinc powder; the best is that prepared artificially by melting zinc and pouring it into an iron mortar. It can be easily pulverized immediately after solidification; it should be about as fine as writing sand. 3d. A solution of protochloride of tin containing 5 to 10 per cent., to which as much pulverized cream of tartar must be added as will go on the point of a knife. The object to be tinned is moistened with the tin solution, after which it is rubbed hard with the zinc powder. The tinning appears at once. The tin-salt is decomposed by the zinc, metallic tin being deposited. When the object tinned is polished brass or copper, it appears as beautiful as if silvered, and retains its lustre for a long time. The author uses this method in his laboratory to preserve his iron, steel, and copper apparatus from rust. This method would become of great importance if the tinning could be made as thick as in the dry way, but this has not as yet been accomplished.—*American Chemist.*

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## ON FERMENTATION.

BY PROFESSOR A. W. WILLIAMSON, F.R.S.

*Before the Society of Arts. Reprinted from the Pharmaceutical Journal, London.*

### Lecture II.

We left off last week at a point at which we had to recognize a difficulty, which we did not, to any appreciable extent, succeed in solving. By considering in succession a certain small number of processes in which substances induced chemical changes in others which were in contact with them, we classified them, beginning with some very complex cases—cases in which substances of formulæ so long that, even if I ventured to give you chemical formulæ at all, I should hesitate to give you their formulæ—took part in the decomposition, and gave rise to products themselves having formulæ of no small complication.

From those we passed to the consideration of some bodies less complex in their structure, and undergoing changes very much like those which we at first considered, but having this remarkable peculiarity that, in these somewhat simpler cases, the changes were effected not only by organic bodies comparable to ferments, but also, in certain instances, by simple mineral bodies, such as the acids. In this intermediate class we found that the same effects are produced, sometimes by diastase, or such-like bodies, and sometimes by sulphuric acid. Then we came to some still more simple cases of decomposition, produced solely by bodies of such simplicity that we chemists have got a tolerably definite idea of them. I gave two cases which, I believe I may say, are pretty well understood. The resemblance between the different terms of that long series served, as I think it will be admitted by those who followed the chain of reasoning, as an argument in favor of there being some great resemblance in the process which takes place in these changes in the successive terms of the series; and I propose, before we proceed further in the study of these wonderful decompositions, to analyze somewhat the nature of these changes in the simple cases which we last considered, in order that we may get, if possible, something like a master-key—a very simply-formed piece of iron—which will open a variety of locks. The two cases which I allude to were, first, the formation of ether and water from alcohol by the action of oil of vitriol; and, secondly, the ordinary process of making oil of vitriol in the so-called lead chambers; and I think it will be admitted, even from the very brief and imperfect statement which I was able to make, that we have evidence of the fact that the active substances do return, after they have been doing one bit of that work, to the point from which they started before doing it. I gave a couple of illustrations of that fact. Sulphuric acid is converted, while making alcohol into ether and water, into a substance called sulpho-vinic acid, which differs from it in a good many properties, and then it comes back again to sulphuric acid. Just so with nitric oxide, in the process of making oil of vitriol; it first takes up oxygen and assumes the form of those red fumes, then hands that oxygen over to the sulphurous acid which is in contact with it, thus coming back again to the state of nitric oxide from which it had started. Hence the term which I have suggested for this process is cyclical, to denote the fact, which I consider essential, the leading fact that it is a cycle, the idea of which implies that the road by which it returns is not the same by which it goes, and I want that idea to be suggested by the word. In the case of etherification, I wish I could lawfully use formulæ on the blackboard, but it would not do, for I am sure that the greater number of my audience will agree with me that it would be a liberty which I ought not to take; but chemists are in the habit of denoting, by the aid of formulæ, particulars which require to be fully explained. I mention that because, excluding that ordinary process, the particulars of my argument must, of course, be omitted, inasmuch as I do not use the language by which alone those particulars can be conveyed. When the sulphuric acid acts upon alcohol, and transforms it, by a succession of these cyclical processes, into ether and water, the general kind of process is this:—A little particle of the acid

—because each one acts like the rest, and we had better consider one as a sample of the rest—first takes something from a contiguous particle of alcohol, and then it hands over this something to another particle of alcohol. That which the acid takes in the first instance is called, in our ordinary language, ethyl. It is a group consisting of carbon and hydrogen, very much like hydrogen gas—it is a group of those elements, and behaves in a manner closely analagous to hydrogen itself. The acid, in doing that particular work which we have to consider, first takes a particle of this ethyl from one particle of alcohol, and whilst it does so, it gives to the alcohol something in exchange; that something is hydrogen. And by doing this, the sulphuric acid which has taken up this ethyl is converted into sulpho-vinic acid; it has gone half round the circle, in fact. The remainder of its journey consists in reversing, in another way, with another particle of alcohol, that very same kind of interchange which it had undergone in the first instance, that is, it gives up again this little portion of ethyl which it had taken, and resumes hydrogen in place of it. Just as that is the general process when sulphuric acid acts upon alcohol, forming it into ether and water, so in the other process, which I just now reminded you of, there is a similar action, only there is this difference—of course, I speak within those narrow limitations which are imposed upon us by our very imperfect knowledge of even these best-known processes—but, as far as we know, the nitric oxide merely takes up oxygen, but gives up nothing in exchange. Those red fumes which you saw were really nitric oxide *plus* oxygen, not nitric oxide in which oxygen had replaced something else, and that was a difference between the process in that case and in the one to which I just now referred. Then, again, it simply gives up that oxygen to the particle of sulphurous acid.

The illustrious Liebig, to whom we owe, in this order of phenomena as in every other order which he has touched, some of the most valuable ideas which have guided our researches, suggested many years ago, for the explanation of the phenomena of fermentation, a theory which certainly has rendered very great service, and not the less so from the fact that it has been replaced by one more perfect. In building a house, it is certainly no proof that a scaffolding is unnecessary that in the final structure the scaffolding is not maintained; and so in the progress of our science, as in every other science, each part of the work must be judged from its usefulness in aiding the carrying on of the building, even though the particular substance which was placed there at the time does not finally form part of the structure itself. Liebig's explanation really is classic, and well worthy of a few minutes' consideration. He classed together a considerable number of cases of chemical action which bore, at least upon their surface, a considerable resemblance to one another, and he saw in them something in common, and by this one resemblance which they had he classed them, considering it to be their essential characteristic feature. For example, there is a substance which is made, by a process of oxidation, of a compound something like lime. It is called baric peroxide. Thenard had found that the oxygen which is here taken up by the baryta can, by a particular process, be passed over to water, so that, in fact, Thenard, from this oxide of baryta, made, by a process which I will repeat on a small scale, some oxidized water, or peroxide of hydrogen, as it is commonly called. Here is some of the peroxide suspended in water, and by adding an acid hydrogen salt, the hydric nitrate, in small quantities (for if I add it in too large quantities, I should destroy the peroxide, which is a very tender substance, and requires to be treated tenderly), I should gradually transfer the oxygen from the baryta, with which it was at first combined, to the water which is here present. This oxidized water, or peroxide of hydrogen, gives up the oxygen which it has just taken up very easily indeed; in fact, the difficulty is to prevent it doing so. Amongst processes of that kind, I will show you one simple one. I will pour into the water in this large beaker-glass some of the solution which I have just prepared, and then add to it a few drops of this red liquid, which is a solution containing chromic acid combined with potash. You see, no doubt, that although I have only added half-a-dozen drops, there is evidence of a chemical change, and the deep blue color which is formed by the contact of the two liquids is due to the formation of a new compound. The chromic acid, which has a red color, takes up oxygen from that peroxide of hydrogen, forming a blue compound. I have purposely chosen this particular instance because the process is a slow one, and we have time to see its intermediate changes. I will leave the glass here, and in a few minutes you will see the blue color will have disappeared, and in place of it we shall have a dirty green color, hardly visible. Whilst that change takes place, if we were to take means to examine carefully what was going on, we should find that oxygen gas passed off, and if we examined the green substance present at the end of the process, and compared it to this original red chromic acid, we should find that it consists of chromic acid *minus* oxygen. The peroxide takes away oxygen from this chromic acid, and yet the chromic acid has got hold of its oxygen pretty firmly; it requires a considerable amount of energy to tear away even that part which is torn away by the process. But at the same time the oxygenated water is losing part of its oxygen. The deoxidation of the peroxide induces the chromic acid to give up some of its oxygen; the one body induces in the other a change similar to that which itself is undergoing. The peroxide of hydrogen is losing oxygen, and it makes the chromic acid also lose oxygen. To state the process in general terms, I may well use the expression of Liebig, and call it contagious action. There are many other cases of similar processes. Here is a bit of rotten wood; if I were to moisten it and put it into a convenient flask, leaving room for a quantity of air, closing the mouth of the flask with a good cork, and leaving it for a day or two, also putting with the air a little hydrogen gas, which, you know probably, is capable of combining with oxygen, I should, on examining the mixture of air and hydrogen after it had been in contact some time with this rotten wood, find that the hydrogen had been removed from the air, and at the same time the oxygen of the air which had been mixed with it had disappeared. Now this wood is actually undergoing a process of combustion; it is actually absorbing oxygen, or being burnt, very slowly, indeed, but still at a rate which is not unimportant, if you want it to last for any length of time. De Saussure, who noticed this, attributed the oxidization of the hydrogen gas to the fact that the wood is itself undergoing oxidation. I will take another case of the same kind. I will put into a little flask some of that peroxide of hydrogen, and will show you another decomposition of it, which is rather more convenient in one respect than the one I first took, as it will show us something more of the process. Into this little flask I put some of the same oxidized baryta which I used just now, and I will fit up the flask in such a manner that the gas, which will come off in a tolerably large quantity, can be collected for examination. I will then put in contact with it a substance called silver oxide, first driving out of the flask all the air which it at present contains. Having driven out the air, I put in a few drops of the nitrate which I employed in the first instance, and then I will put in a solution of silver oxide, which is, in some respects, a good deal like this chromic acid, at all events in one important respect, for it has oxygen, which it can give up under sufficiently strong pressure. You now see there is a great deal of effervescence going on, and the gas which is coming off from the little flask is rising into this jar, where we shall very easily be able to ascertain whether it is oxygen by the ordinary test. I should have been glad, if it had been convenient to do so, to give you one other instance in which a remarkable fact was discovered by Professor Brodie, viz: a case of an action of this kind, where the oxygen taken from the peroxide is in quantity exactly equal to the quantity of oxygen from the other body. Whilst that gas is collecting, I must enter shortly upon a theoretical question, apologizing for doing so, not that I am ashamed of it, for it is one of the most important theories we possess, but on account of the brevity with which I am compelled to treat it. Oxygen, in the free state, is admitted by chemists to consist of two little atoms linked together. In each of the compounds which I used there there was one little atom of the kind. One atom leaves each of them, and when I get free oxygen, I affirm that there has been a process of combination, that the oxygen from the one substance actually combined chemically with the oxygen from the other. This is a theoretical result which has been, in great part, established by Sir Benjamin Brodie, with the help of materials from various sources. What I mentioned in the other case holds good equally in regard to chromic acid and the other cases in which there was apparently no definite proportion of the kind. There is an actual chemical combination between the oxygen of one substance and that of the other; it is not merely that the one substance is compelled to decompose because the other is decomposing; there is between the one substance and the other an interchange, so that a constituent from each one combines with a constituent from the other. To do justice to the importance of this fact I should need to describe a great number of chemical reactions, which at present would be impracticable, but you may take my word for it, that the kind of process which I have described is now known to be one of the commonest in chemistry. The other day, when I mixed two of the commonest substances, there were interchanges between the constituents by a process perfectly analagous to that which takes place here. Here it happens, by an exceptional circumstance, that the element which from the one body combines with the element of the other is of a like kind, whereas, as a rule, you find that unlike elements unite together in these processes. Thus it is that the anomaly which Liebig noticed ceases to be an anomaly, and is brought back to a case of common regular chemical action by the aid of that theory to which I have just alluded.

To return to our experiment. This glass vessel is now full of the gas, and by applying a taper which has been lighted and blown out, but is still glowing, we shall find, on putting it into the jar, that it immediately ignites, which is the ordinary test of oxygen gas. By the aid of that theory, which has been discovered since the time of Liebig's suggestion, this one case of apparently anomalous action has been proved to be a perfectly normal and regular case of combination, and the same kind of thing has been done with regard to other cases of the same description. A number of other processes which he classes with these may be shown to be due, not to any exceptional force that is at work in these cases, not to the force of any particular contagious action among chemical substances, but to the ordinary forces which induce chemical combination in the cases best known to us. Liebig's theory of contagious action has been alluded to, by a high authority in this country upon philosophical matters, as being a law of chemical action of a generality comparable to the law of gravitation in astronomy, and for that reason, if for no other, it must be of considerable importance to know what bearing our most advanced knowledge has upon that law. I dare say you see the connection between it and the case of fermentation. I will not go into particulars, further than is necessary in order to show you the general analogy.

(*To be continued.*)

## EDITORIAL.

### THE STAMPING OF PROPRIETARY ARTICLES.

For some weeks past a system of espionage has been in vogue in this city, having in view the prosecution of druggists who fail, under any circumstances, to properly affix revenue stamps upon proprietary articles. It is carried out in this wise: A couple of men call at the store, inquire for a bottle of perfumery, and in making a selection take pains to examine the whole stock as closely as may be, not only of perfumery, cosmetics and colognes, bay rum, &c., but everything else within their inspection. If by chance a bottle or package is found without a stamp, or not stamped to its full retail value, it is forthwith seized, pocketed and paid for, giving the apothecary neither time to scrutinize the package nor to enclose it in a wrapper. Before long he is reminded of the occurrence by a formal notice to appear before the commissioner, in answer to a charge of selling, or exposing to sale, unstamped proprietary goods. We would not for a moment have it understood that we in any way advocate an evasion or neglect of this or any other legal obligation; but what we do object to is the system of detective oppression, which is bad enough in itself under any circumstances, but liable to abominable abuse when in the hands of unscrupulous men. The latter are actuated by a single motive—that of pecuniary gain; for, as informants, they receive one-half of the fines imposed. When a man descends so low as to follow this path for a livelihood, we are led to fear that Darwin has not, in his scientific deductions, hit upon the progenitors of a portion, at least, of the human family; for such he must go a little beyond the monkey, and adopt in his stead the historical personage with horned head and barbed tail.

The chief difficulty which apothecaries have to encounter, and which is most annoying, is this: that it is next to impossible to understand from the voluminous laws, and their voluminous and various interpetations by different commissioners, exactly what is or is not subject to stamp duty. We have suggested several questions of this nature to a number of druggists, and have found opinions greatly at variance with each other, and often directly conflicting, upon almost every article proposed.

Recently, druggists of this city have been heavily fined for selling cologne, hair oil, bay rum, &c., over their counters by the ounce, without stamping the bottles which they have filled, neglecting the duty, in some instances from sheer forgetfulness, or haste in the press of business; in others from the want of a proper understanding of the revenue laws.

The whole system of stamp taxation is pernicious, and a reform is greatly needed. We believe it can be shown that other means of raising revenue, more efficient and less burdensome upon the retail dealer and consumer, can be devised, and we think it is time for apothecaries to take the subject under serious consideration, tion, and make a united movement looking to relief.

In this connection the following letters, bearing upon the question of stampable articles, will be of interest to our readers:

TREASURY DEPARTMENT, OFFICE OF INTERNAL REVENUE,
WASHINGTON, March 20th 1871.

E. H. SARGENT, ESQ.:

*Sir:* I reply to your letter of the 17th inst., that "Bay Rum," whether imported or of domestic manufacture, is liable, under the terms of Schedule C of the excise law, to stamp duty.

The law imposes a stamp tax on all articles "used or applied, or to be used or applied as perfumes, or applications to the hair, mouth or skin." This clearly covers bay rum, cologne water, and similar articles.

Very respectfully,
A. PLEASANTON, *Commissioner.*

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TREASURY DEPARTMENT, OFFICE OF INTERNAL REVENUE,
WASHINGTON, March 29, 1871.

E. H. SARGENT, ESQ., PRESIDENT CHICAGO COLLEGE OF PHARMACY.

*Sir:* Your letter of March 23d, enclosing a list of perfumery, cosmetics, medicines and other articles, has been received.

You wish to know whether the articles named in this list are liable to stamp tax under "Schedule C," and ask me to write against the name of each article on the list "Yes," or "No," thus deciding its liability or non-liability to stamp duty.

In answer I have to say that this office cannot always decide from the simple name of an article, whether or not it is liable to stamp duty, and consequently cannot mark your list as you desire.

All perfumery and cosmetics, whether imported or of domestic manufacture, and whether sold or offered for sale in large or small packages, unless sold in the original package as imported, are liable to stamp duty under "Schedule C."

When a bottle or other vessel is brought to a dealer or druggist to be filled with a perfumery, cosmetic, or medicine, and he fills it from a properly stamped package, he need not be required to stamp the bottle or vessel so filled for the party bringing it. But when a party sells a bottle, and then fills it gratis or otherwise, with a perfumery or cosmetic, not from a stamped package, and delivers it without stamping, he violates the law. Such an act would be regarded as an attempt to evade the payment of a legal tax, and it should be visited with the full penalty which the law provides.

Some medicines are liable to stamp duty while others are not. The liability of a medicine to stamp duty depends upon whether it is a patent or proprietary article, or whether it is recommended as having any proprietary claim to merit as a remedy for any disease or diseases of the human or animal body, or is made or prepared under any private formula or occult secret or art, or is put up in the form or style of patent or proprietary medicines in general. For further information on this subject you are referred to Schedule C, of the Internal Revenue Law, and to your Assessor. If you are unable to decide in regard to the liability of any particular medicine, and will send to this office a full statement in regard to it, with the printed labels and recommendations relating to it, I will endeavor to make the decision for you. Very respectfully,

A. PLEASANTON, Commissioner.

## COLLEGE COMMENCEMENTS AND CELEBRATIONS.

THE CHICAGO COLLEGE OF PHARMACY.—In the session lately closed in this institution the usual commencement exercises were omitted in view of the fact that it was the first course of instruction given before the college during several years, and, as a consequence, the attendants were almost exclusively first course students, and not eligible to graduation. The only exception to this rule was in the case of Mr. F. M. Goodman, of this city, upon whom the degree was conferred.

The trustees of the college are highly gratified with the success which has so far followed the re-establishment of the school of pharmacy, and look forward to its future prosperity as a certainty. With the coming season a more extended and more thoroughly systematized course of instruction will be inaugurated—full particulars of which we hope to be able to present to our readers in our next issue.

THE NEW YORK COLLEGE OF PHARMACY.—The annual meeting of this college was held at its rooms in the University Building, March 16th, last. The President, after a short address to the graduating class, conferred the degree of "Graduate in Pharmacy," upon ten gentlemen, Mr. Edwin Henes, formerly of Chicago, receiving the College prize for the best general proficiency in studies, and also the prize awarded to the student passing the best examination in botany and materia medica.

The treasurer's report shows an excellent financial condition, but an effort is being made to increase the available resources of the college, which, it is hoped, will prove successful. The election of officers for the ensuing year took place, which resulted as follows: President, William Hegeman; Vice Presidents, Theobold Frohwein, Isaac Coddington, Wm. Neergaard; Treasurer, William Wright, Jr.; Secretary, Edward L. Milhau; Trustees, Paul Balluf, H. A. Cassebeer, Jr., Chas. Rice, P. W. Bedford, John Frey, John W. Shedden, Geo. C. Close, David Hays, A. W. Weismann; as Delegates to the meeting of the American Pharmaceutical Associatiou, at St. Louis, in September next, P. W. Bedford, William Hegeman, E. L. Milhau, M. L. M. Peixotto, William Wright, Jr.

THE PHILADELPHIA COLLEGE OF PHARMACY.—The fiftieth annual commencement of this college took place on Wednesday evening, March 15th ult, at the Academy of Music. Prior to the commencement of the exercises, the Germania Orchestra performed several choice selections. At eight o'clock the graduates, accompanied by the officers of the college, moved in procession from the green room, through the auditorium, to the stage, where the degree of Graduate in Pharmacy was conferred upon each by the president of the college.

The valedictory address was then delivered by Prof. Parrish. It was replete with good council, and eminently interesting; want of space only, prevents us giving a synopsis. The class during the past year numbered 198, and the graduates 69.

## THE SEMI-CENTENNIAL ANNIVERSARY OF THE PHILADELPHIA COLLEGE OF PHARMACY.

We were honored with an invitation to participate in the ceremonies held in honor of the semi-centennial anniversary, and most gladly would we have availed ourselves of the privilege, had other duties permitted our attendance. As we anticipated, the occasion was highly enjoyable, and worthy of the event which it was designed to commemorate. We condense from the American Journal of Pharmacy the following notice of the affair:

The members of the college and guests, to the number of two hundred and fifty, assembled in the college hall, on the eventful day—February 23d ultimo. Every preparation which might give interest to the meeting, had been made by the committee of arrangements. A most curious and instructive display, illustrating the progress of pharmacy, consisted of antiquated apparatus, labels, chemicals, &c., in contrast with those of modern construction. Mr. Dillwyn Parrish called the meeting to order, and requested Mr. Peter Williamson to preside, the latter gentleman having officiated as secretary at the initial meeting of the college fifty years ago. In taking the chair, Mr. Williamson made a few remarks appropriate to the occasion, and called for the report of the secretary. Mr. Chas. Bullock, in response, read the minutes of the first meeting of the originators of the college of apothecaries, held February 23d, 1821. He detailed many circumstances relating to the infancy of the college. Mr. J. T. Shinn followed with a historical memoir of the college, alluding to those who had notably rendered it assistance.

Remarks were made by Drs. R. E. Rogers, Leedy, and S. D. Gross, and by Prof. Parrish.

Mr. Wiegand spoke in regard to the work accomplished by the college, and its organ, the American Journal of Pharmacy, now in its forty-third volume. He feelingly alluded to the resignation of the editor, Prof. Proctor, and the reasons which led to its acceptance. After expressing his own regrets, and those of the college, he remarked that one duty yet remained to be done—that of acknowledging the great debt owed the editor for his untiring labors. He therefore asked his acceptance from his many friends of a testimonial to this feeling.

Prof. Proctor, who, until that moment, was unconscious of having any part to act on the occasion, was completely taken by surprise when Mr. Wiegand stepped toward him and presented a handsome gold watch, bearing his monogram, and a complimentary inscription.

Prof. Proctor replied in fitting terms, thanking his friends for the valuable gift. He spoke of the Journal, and of those who have assisted in making it what it now is.

Prof. Moore, and Mr. A. P. Sharp, of Baltimore, being called upon, offered a few remarks in sympathy with the college and its anniversary.

The meeting then adjourned to the main lower hall, where an ample collation had been provided for the company; after the repast, the remaining hours were spent in genial intercouse of old and new friends, and in the examination of the practical laboratory, and the cabinet and library of the institution.

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THE bill for the regulation of the practice of Pharmacy in this State, has been presented to the legislature, and has received the indorsement of several prominent and influential members. It has not, however, been brought forward for discussion, owing, we presume, to the press of other business. The bill has been very favorably received by physicians in this city, and by others who have considered its provisions. It is to be hoped that it may be acted upon before the close of the present session of the legislature.

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BOOKS AND PAMPHLETS RECEIVED.—The Chemists' and Druggists' Compend; A Handbook of Practical Receipts and Processes. By R. Jones Owen, author of "The Practice of Perfumery." 8vo, pp. 104. London, Eng., H. J. Wicks.

This little work comprises a great variety of useful receipts, especially for preparations which are of recent introduction. The compiler has certainly been a faithful reader of pharmacal literature, for we see evidence of it on almost every page of his work. For the benefit of our readers we shall make extracts from it at some future time.

Specimen Book of Labels, &c. Published by P. L. Hanscom & Co., Manufacturers of Gummed and Cut Labels, Union Building, Chicago.

We would not know where to look for a finer collection of Labels than we find in the book before us. We are obliged to acknowledge that the art of label printing has kept pace with the progress of pharmacy; indeed, we are tempted to rank it among the fine arts, when we view the chaste designs, and the beautiful manner in which they are transferred to paper, in one or many colors. These requisites, combined with gummed backs and neatly trimmed margins, constitute, to our mind, the perfection of a label,—making it an ornament to any package—a necessity to the successful druggist.

A number of book notices are crowded out, but will appear in our next issue.

## OBITUARY.

It is with no ordinary feelings of sadness that we are called upon to record the death of our former friend and colleague, Ferris Bringhurst, of Wilmington, Del., which took place under most painful circumstances, on Thursday, the 16th ultimo. Mr. Bringhurst had been announced to deliver a lecture before the Workingmen's Institute of his city, on Saturday the 14th, and on that day, in order to illustrate his subject, he was engaged in the preparation of a quantity of oxygen, using an iron retort, and, it is supposed, the chlorate of potassa, when a terrific explosion took place, prostrating Mr. Bringhurst in an unconscious condition. An examination disclosed a fracture of the skull, from which a fragment of the retort was subsequently removed. All that surgical skill could do was of no avail, and he lingered in a state of stupor until death came to his relief.

Our acquaintance with Mr. Bringhurst dated from the meeting of the Amer. Pharmaceutical Association in this city, in 1869, an occasion which brought together so many co-laborers in the field of chemistry and pharmacy. Among the number we can recall none as more genial, frank and enjoyable than our lamented friend. Thrown frequently in his society at that time, there is no wonder that we were attracted by his noble qualities of mind and heart, and that we now remember with keen regret the hearty grasp of the hand and meaning farewell, which, alas! were the last tokens of sympathy and good wishes for us to exchange on earth. Esteemed by all who knew him, his early death, at the age of 34, will leave a void which cannot be filled.

We have received the following tribute to the memory of Mr. Bringhurst, which we gladly insert:

The Alumni Association of the Philadelphia College of Pharmacy have heard with feelings of deep regret of the sad accident, which has since resulted in the death of our much beloved colleague, Ferris Bringhurst, of Wilmington, Del., and it was the desire of the meeting that the undersigned committee should express their feelings of sorrow at the loss of one with whom all had been associated so pleasantly.

We cannot recall a single instance in which his sympathies and actions were not at once enlisted on the side of truth and justice, and in his quiet, steady opposition to deception and insincerity, or indeed anything that would hinder the progress of the science he loved, or lower the standard, we see the manifested fruit of an inner life that was unselfishly engaged in benefiting his fellow men.

Though the accident which resulted in his death was a most painful one, our grief is rendered less severe when we reflect that he was engaged at the time in this most laudable calling of serving his fellows; and another name has been added to that list of martyrs who have lost their lives in various ways by generous self-sacrifice.

We do most sincerely sympathize with the bereaved and afflicted family, and whilst we feel that we have lost a noble co-laborer, and will sadly miss his cordial shake of the hand, his genial smile and his polished pleasantry, we bow in submission to the will of "Our Father in Heaven," "who doeth all things well."

Signed,
JOSEPH P. REMINGTON,
THOMAS S. WIEGAND,
WILLIAM C. BAKES,
CHARLES L. EBERLE,
RICHARD M. SHOEMAKER,
} *Committee.*

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## CORRESPONDENCE.

A. B., Cleveland, O., sends a traced copy of a prescription, which reads as follows:

℞ FeO. PO.
CaO. PO. āā ʒ iss
PO solution f ʒ i
Ol. Gaulther m iv
Syrup Simp
Aqua aa f ℥ ii
M ft. Sol Sig f ʒ i three times a day, after eating.

Our correspondent writes: "Is the same correct? Would you encourage this style of prescribing, or advise this scientific prescriber to study the chemical formulæ better before making any more attempts of this kind? The ℞ is intended to read, viz: Hypophosphite of Iron, Hypophosphite of Lime, āā ʒ iss; Phosphoric acid, dil. ʒ i; Oil Wintergreen, ♏ iv, water and syrup, each ℥ ii."

We have long been aware that, in the art of prescription writing, our physicians have many improvements to introduce. Reference to any prescription file, even in cities, will reveal at once a woeful deficiency, on the part of many prescribers, in their knowledge of the classic language in which they attempt to clothe their productions, and in some instances a similar imperfection in reference to their mother tongue. We might imagine, indeed, that a new medium of communication had been invented by this scientific class of society, which consists of an indiscriminate mixture of English and Latin words, the latter used without the slightest regard to their terminations, or to other rules of Latin grammar. We are strongly reminded of what, in our younger days we understood as "dog Latin." When physicians have mastered the elementary principles of "latinity," and applied the knowledge to the improvement of their style in prescription writing, it will be time enough to consider the propriety of introducing further scientific language—as the symbolic notation.

The prescription sent by our correspondent is subject to criticism in many particulars, but it is not worth our while to engage in the unprofitable task, excepting to mention that the formulas for the hypophosphite of protoxide of iron, and the hypophosphite of lime, are incorrectly written; they should read, $FeO, 2HO, PO$, and $CaO, 2HO, PO$.

We do not know our correspondent's authority for his interpretation of the prescription, but either he or the doctor is sadly at fault in reference to the acid prescribed. We take it that the physician meant to indicate a solution of *hypophosphorous* acid, $3HO, PO + aq$, which is usually associated with the hypophosphites, and that our correspondent's knowledge of symbolic notation is capable of extension.

J. W. H., Conshohocken, Pa., writes: "Will you be kind enough to give me a formula for Liquid Rennet, through the columns of your valuable Journal?"

The following receipe is due to Prof. Proctor:

*Liquid Rennet, or Rennet Wine:*

Take of fresh Rennets (about three) ℥ xxiv.
Chloride of Sodium, ℥ iii.
Alcohol, f ℥ vi.
White Wine, f ℥ xiv.
Water, a sufficient quantity.

Having turned the rennets inside out, and washed them by a gentle stream of water for a few moments, without any friction, and having placed them in a shallow dish, sprinkle half of the salt over them, and, with the hands malaxate them vigorously for fifteen minutes, aiming to disengage the mucous secretion, then add a pint of water, again malaxate, and after standing several hours strain off the thick mucilaginous liquid, by pressure in a loose-textured cloth.

Return the rennets to the dish, sprinkle on the remainder of the salt, and again repeat the process of malaxation, maceration and expression. Let these operations be repeated a third time, or until the fluid obtained measures forty-two fluid ounces; then, having mixed the alcohol with the wine, add them to the expressed liquid, and agitate the mixture several times at intervals of an hour or two; after which allow it to stand until the mucous, which is precipitated by the alcoholic solution, subsides, when the nearly clear solution of rennet may be drawn off with a syphon, and filtered for use. The wine may be substituted by a mixture of one part of alcohol and three parts of water.

A tablespoonful of this solution readily coagulates a quart of milk to a firm curd, if added after gently warming the milk (to 100° F.), stirring it well for a moment, and allowing it to stand undisturbed for half an hour. *Cold Custard* is made in the same manner, by previously adding a tablespoonful or more of sugar, and some vanilla or other flavoring, before adding the rennet.

THE PHARMACIST

AND

CHEMICAL RECORD.

VOL. IV. CHICAGO, MAY, 1871. No. 5.

# SUPPOSITORIES.

## AN INAUGURAL ESSAY, BY F. M. GOODMAN.

The etymology of the word Suppository conveys at once an idea of the use of the class of pharmacal preparations to which it is applied. It is derived from suppositorius—"underneath"; called also hypotheton; from *ypo* "under," and *tu themi*, "to place," and sometimes Balanus (*balanos*), an "acorn"; in reference to the shape, that of a sphere, or an oblong body; these were intended for rectal use only.

As it became evident that medicines applied to the mucous membranes of the vagina or rectum had the same systemic effect as when taken into the stomach, and that, being so applied, they were less repulsive to the patient, advantage was soon taken of this form of administration. It then became necessary to distinguish between rectal and vaginal suppositories, consequently the former were called *suppositorium*, and the latter *suppositorium uterinum*, which were the medicated pessaries of the ancients, and are still frequently prescribed as pessaries; in fact, medicines applied to *any* of the mucous membranes were called suppositories—what is now termed a lozenge or troche, was formerly known as a suppository, or Bacilla, the latter signifying "a stick."

From this method of treatment arose the custom, though not as yet very prevalent, of applying medicines in the solid form to the urethra, in the treatment of urethritis, &c.

It is only within the last decade that this method of medication has reached a state approaching to perfection, but it is now such an important feature that it is almost of daily occurrence to dispense suppositories, though we have no officinal directions for their preparation. To those unaccustomed to dispensing suppositories, their preparation often proves a difficult task, but by experience one may become so expert as to make a dozen within fifteen or twenty minutes, so that a patient is not called upon to wait longer for suppositories than for a dozen pills or powders.

MOULDS.—These are in great variety, but the most common are conical shaped, and made of block tin; they are of two sizes, the vaginal and rectal; the former making a suppository weighing two drachms, and the latter one of thirty-five grains. It is customary for pharmacists to have these two sizes, but if an intermediate size were furnished, such as would mould suppositories weighing one drachm each, the latter size would satisfy the majority of physicians better than those now dispensed. It is complained that the large are *too* large, and the small are *too small*, but if of the size above indicated, they could be used as vaginal or rectal, in most cases.

In using these moulds a tray is necessary, which may be constructed in the following simple manner: For one dozen vaginal moulds, purchase a tin pan about seven or eight inches in diameter and four inches in depth; have a sheet of tin cut to fit the pan about half an inch from the top, perforate the tin with holes sufficiently large to allow of the ready admission and removal of the moulds; of course, the rectal moulds will require a smaller pan, or the same pan and a sheet of tin with smaller holes.

If the inside of these moulds be examined, there will be observed a great number of annulations made by the instrument used in turning the model from which they were cast, but by polishing, these rings may be worn off, when the inside becomes very smooth. It is on this account that suppositories are best made in old moulds.

A very nice mould, called Weigand's, invented by Mr. T. S. Weigand, of Philadelphia, is made on the principle of the ordinary bullet mould; two parallel bars of brass, with the proper cavities in each, are hinged at one extremity, and have handles at the other; these moulds, when in use, are kept closed by slipping a ring, made for the purpose, over the handles.

They are made for six, nine, or twelve suppositories, which weigh about forty grains each.

It has been asserted that these moulds are worthless, cracking the suppository in two, when opened, even when Lycopodium, Arrowroot, or other substance has been used to prevent adhesion. The writer has used these moulds a great deal, and has found the only and a *sure* way of making a perfect suppository is to have the moulds *thoroughly refrigerated, and their surfaces well polished;* when the latter requisite is once attained, it can be easily preserved by rubbing whiting with a piece of chamois skin into the moulds each time, before putting them away, and wiping with the chamois before using. Wiegand's moulds may be refrigerated very perfectly without the use of ice, in the following manner: Close them, and place the handles in the spout of a hydrant, allowing the orifices of the moulds to be downward; place a box in the sink on which to rest the lower end, and set the water running gently over the moulds, before beginning to melt the ingredients; when wanted, wipe them quickly and fill; then set them into a shallow vessel containing water, and when a pellicle has formed on the surface of each suppository, replace the moulds under the hydrant.

Some object to this method, saying that the water in passing over the suppositories dissolves out some of their soluble ingredients; but this cannot be considered an objection, for the moulds are very seldom or *never* filled exactly full, but a little too much is poured into each; and when they are cold enough to be removed, the superfluous material is scraped or trimmed off with a spatula, before the opening of the moulds. In doing this, the portion that has been exposed to the influence of the water is removed.

Moulds are also made of paper, by having a piece of wood about six inches long, one end of which is formed into the shape of a suppository, which must be perfectly conical, and *not* like the ordinary suppository, which is more or less *rounded* at the apex; for if it be rounded in the least, it is impossible to wrap the stiff paper around it so as to make a neat looking mould.

The paper for this purpose may be thick writing-paper; tin-foil is also sometimes used, and answers the purpose very well. When in use, these moulds are held in an upright position by placing them in round holes bored through a thin board, or by standing in a vessel filled with flaxseed, or other suitable substance.

The urethral-mould, or syringe, as it is commonly called, is simply a glass or hard rubber tube, three or four inches in length, having a piston fitted to it. The caliber of these moulds is sufficiently large to make a suppository about an eighth or three-sixteenths of an inch in diameter, which is to be an inch and a half or two inches long, and to weigh from seven to fourteen grains. In using these moulds, two lengths are moulded at once, and the piece is then cut in the center. An ordinary funnel-tube answers the purpose of a mould admirably, for if such a tube be used, say twelve inches long, it can be graduated by scratching with a file, into two-inch spaces.

In the suppository syringe the piston is a rod of glass, with cotton wrapped around it at about *half an inch from the end*, and this uncovered portion of the rod disfigures the end of the suppository when any pressure is used in expelling it. For this reason the funnel-tube is preferable, for the piston being of wood can be cut, and wrapped close to the end, which may be made of the same diameter as the suppository, so as not to mar it.

VEHICLE.—That recommended by the British Pharmacopœia is composed of equal parts of prepared lard and white wax, but this is a very poor vehicle; among the objections to it is, that pharmacists *very seldom or never* render or prepare lard for their own use, and consequently rely upon the integrity of the packers, or butchers; now it is well known that commercial lard is impure—that the renderers frequently stir in water, and occasionally a solution of sulphate of copper or of alum, salt, &c., to whiten it; of course the lard is thereby rendered unfit for pharmacal uses.

The vehicle of the B. P. is objectionable also as regards its melting point, which is 104° F. (40° C.), or much above the temperature of the human body.

The substance most usually employed for the purpose in this country, is a mixture of Cocoa Butter and Spermaceti, in the proportion of fourfifths of the former to one-fifth of the latter, in summer, and five-sixths to one-sixth in winter; the above proportions will answer also for Cocoa Butter and White Wax. These mixtures become soft at 79° F. (26.1° C.), and 82° F. (27.7° C.), respectively, and consequently readily melt at the temperature of the body, in this respect answering an essential requirement of suitable vehicles, and as such they are generally employed.

But why should these substances be used when in sevum or suet we have a material that answers all the requirements of a good vehicle? Suet has about the same *softening* point, 80° F. (26.6° C.), and is doubtless superior to the above mixtures in this: that it sets or cools much more readily. This constitutes quite an advantage, while the expense of the material is only about *one-sixth* that of the former. To prepare it, take the kidney suet of Ovis Aries, and purify as directed in the Dispensatory, by cutting into small pieces and melting over a moderate heat, and straining through linen. According to the Dispensatory, suet is inodorous, but practically it is never free from an odor, which is rather disagreeable, but which may be overcome by the addition of a small quantity of an essential oil to the cooling mass. For this purpose I use a mixture of the oils of lavender and sassafras in equal parts; about two or four minims to the troy ounce is sufficient. This addition not only destroys the odor, but acts as a preservative, and prevents the suet from becoming rancid as soon as it otherwise would; a solution of Benzoin is also very good for this purpose. After the oils or Benzoin have been added, the melted fat should be poured into cold, shallow vessels, such as the covers of earthenware jars, in order to get it in sheets resembling white wax. Prepared in this manner it will keep a considerable length of time—usually as long as is required,—and the stock can at any time be renewed from a neighboring market.

Suet is capable of absorbing about one fluid drachm of water to the troy ounce, so that it is easy to combine with it a concentrated mucilage of elm (which also acts as a preservative), or an aqueous solution of an extract, or of salts of various kinds. Some object to adding water to suppositories, as it promotes rancidity, but this is not a very serious objection, for finished suppositories are not required to be long kept. Water has the same effect upon Cocoa Butter as upon suet or lard. These bodies if exposed to the air absorb oxygen, and become quite acid; the fatty acids are naturally in combination with Glyceryle, but they will not combine with the hydrate of that base, and the presence of water accelerates the decomposition of fats, inasmuch as it supplies all that is necessary—in connection with the absorption of oxygen—to form a hydrate of the oxide of the radical Glyceryle, $C_6H_5O_3+3HO$ or Glycerin, with the elimination of fatty acids. The fluids thus set free, separate from the concrete matter, and as a consequence rancid fats have the appearance of a mixture of a solid granular substance and a fluid. These fatty acids produce the irritating properties possessed by rancid fats.

In former times soap was frequently employed for suppositories, but is seldom used at present.

PREPARATION.—Several years ago it was customary to mould a cone of some vehicle, then bore a hole into its base, and into this opening was inserted the medicinal substance; the opening was then closed by pouring in a little melted vehicle and smoothing off with a spatula. But in boring these holes there is danger of cracking the cone. A much better and far less troublesome method, is to fill the mould with melted vehicle, and when it has begun to *set*, or has formed a thin coating on the inside of the mould, the still liquid portion may be poured out, and a very perfect hollow cone is the result. These cones may be kept on hand, and any substance prescribed can be inserted, and the openings closed as above mentioned.

When the material to be used as a vehicle is melted, it should never be put into the dish in large pieces, for such a prolonged application of heat is necessary to melt them, that the substance becomes unnecessarily hot, and consequently requires a considerable time to cool. The best way is to have the material as finely divided as possible. To *cut* it into small pieces, or to *scrape* it, is rather difficult, but the following plan will be found very expeditious, and has the desired effect, viz: Take a plane, such as carpenters use, invert it, letting it be at rest; spread a piece of paper under it, and "Cocoa-Butter the plane and not plane the Cocoa Butter." Having on hand a supply of this shaved material, be it either Cocoa Butter and spermaceti, or suet, the necessary quantity is weighed and placed in a dish, and a very slight heat is employed—just enough to render it fluid.

As generally prepared, the medicinal ingredients are intimately mixed throughout the entire mass, which should be perfectly free from lumps, to prevent the accumulation of which is the most difficult part of the operation.

In preparing suppositories it is always best, in the experience of the writer, to use two dishes—one in which to melt the vehicle, and the other to be used for mixing the medicinal ingredients, as extracts, or other substances that may have been ordered. The latter vessel also is to receive the melted vehicle added in small portions from the other dish. If the vehicle is too warm when mixed with the solution of the extract, the extract will separate. This difficulty may be overcome by setting the dish in cold water and stirring constantly till the mixture becomes thick, by which time it is usually smooth. When the remainder of the warm vehicle is added it will raise the temperature of the cooled portion, in doing which its own temperature will be diminished and the whole will be smooth and uniform. When it has cooled sufficiently, indicated by its consistence, which should be that of honey, it may be poured into the moulds.

In making urethral suppositories, the writer has found the following to be a rather difficult method, though recommended by some. It is certainly less convenient than moulding in a glass tube: Take a sufficient quantity of the shaved material, place in a dish and heat enough to render it a *little soft* (without melting it)—about the consistence of paste. This can also be done in a warm mortar, which, being very thick, will retain the heat for a considerable length of time; enough of the substance may be removed to make one or two suppositories, and the remainder will retain its soft condition while left in the warm mortar. While the substance is in this semi-solid condition, remove it from the dish or mortar to a board about twelve inches wide, divided into two-inch spaces. The board is constructed on the principle of a pill machine, having strips on either side, so arranged that they may be replaced by strips of other sizes, according to the diameter desired for the finished suppository, which varies from one to three-sixteenths of an inch. There is also provided a flat piece of wood for a roller. The material is placed upon the board, and rolled out as in rolling pills, into pieces which may be twelve inches long, if the operation be successfully conducted. The rolled mass is then divided into equal parts according to the two-inch marks upon the board.

The difficulty in this process is that the substance is not very tenacious, and upon cooling cracks and crumbles beneath the roller, though one or two may be rolled at a time very readily.

When the urethral suppository is moulded in the funnel-tube, the method adopted to remove the moulded mass is to get the tube *very* cold, so that a little pressure with the piston will expel it, or, to get it thoroughly chilled, then to dip it into water warmed to about 85° or 90° F., and removing it from the water, to apply pressure by the piston; when two inches are expelled, cut it off, and expel two inches more, &c. When cut off, the pieces may be laid gently on a piece of paper, or allowed to drop into cold water.

In order to fill this tube, the lower end must be closed, which may be done by dipping it into the melted vehicle, placing the finger over the upper orifice, and then holding the lower end in cold water. The substance within the end will congeal and prevent the egress of the liquid portion subsequently added.

In using the metallic moulds, it is a source of great annoyance to have the suppository stick fast to the mould, which is invariably caused by not having the mould cold when filled. This is an extremely essential point. The tray should be filled with ice and water, and allowed to stand a few minutes before using, in order that the mould may become thoroughly chilled.

In an article written by Mr. J. B. Moore, which appeared in the *American Journal of Pharmacy*, Vol. 40, page 226, he considers it in accordance with a good product to have the moulds dusted with Lycopodium, arrowroot, or other similar substance, as *well* as being chilled, and this *may* be essential if the moulds are *never cleaned*, but is certainly not, as he has probably observed, if they are properly polished. A mould, after having been used five or six times, should be well cleaned with powdered pumice, then polished with whiting, and this *must* be done if we expect a good product.

In making extract of opium suppositories, some powder the extract, in order to do which it has to be perfectly dry, and in drying it loses from five to fifteen per cent. of moisture, which necessarily increases its strength. The writer, however, prefers reducing this extract, as well as most others, to a thin consistence with water, which in the amount necessary is unobjectionable. Sometimes glycerin is better.

Elm is frequently prescribed in the form of a suppository for its emollient effect, and may be incorporated in the following manner: Cut the elm into small thin strips, macerate for half an hour in hot water, strain through muslin with strong expression; repeat the maceration and straining again; mix the strained liquids and evaporate. If any salts are prescribed in connection with the elm, they should be dissolved separately and mixed with the mucilage, and the whole should be evaporated to a very thick consistence; to this paste, while still hot, the melted vehicle should be added, in small quantities at a time, with vigorous stirring. When it begins to thicken, fill the moulds, and when cold, with a spatula, scrape the surface quite level.

If the operations have been properly conducted, the suppositories will drop out upon inverting the mould.

From the foregoing remarks we extract the following three paragraphs as giving the essential requirements for the production of perfect suppositories:

*First.* Have the moulds clean.

*Second.* Have them very cold when filled.

*Third.* Have the substance about the consistence of treacle when poured into the moulds.

DISPENSING.—In dispensing suppositories care should be taken that they are placed in a box of the proper size, and are well packed to prevent their being broken while in the hands of the messenger. In very warm weather some pharmacists direct the messenger to carry the package by a loop in the string, which they form for that purpose in tying it up. This is to prevent their becoming soft, which might happen if put into the pocket or grasped with the hand; but this precaution is unnecessary in most weather; indeed, it can scarcely be called a *precaution*, for, being carried in that manner it is apt to be exposed to the direct rays of the sun during transportation, which would be more apt to fuse them than the heat from the body. ¶

It is customary to place cotton above and below the suppositories in dispensing, and for this purpose the common white cotton is frequently employed, but the bright pink, or jeweler's cotton, appears much better. It should be laid on the counter and pressed with the hand, and then cut of the proper size to fit the box, which should be of the following dimensions: For one dozen vaginal, three and one-fourth inches long, two and one-fourth inches wide, one and three-fourth inches deep. For one dozen rectal, two inches long, one and a half inches wide, one and three-eighth inches deep.

The box should be constructed with regard to its use, and be made of some material that will not show the grease spots. A box covered with paper made in imitation of morocco, of a dark brown or black color, is perhaps best adapted to this purpose, for it does not show the grease, and on this account would be preferred by all who wish the reputation of neat and tasty dispensers.

CHICAGO, February, 1871.

# SOPHISTICATIONS.

Editor Pharmacist:—Allow the undersigned, to call, through your journal, the attention of the professional brethren to some articles, which, in the run after the "almighty dollar," have been brought in the market, to impose upon too confiding Pharmacists and upon the public.

The first is "Liebig's Extract of Malt," manufactured by J. M. Hirsh & Co., in this city. Although its label informs that the manufacturers have been awarded a prize medal at the Paris Exposition, the vignette of Louis Napoleon has lost its charm, and cannot make this miserable preparation good, nor shield it from the deserved exposure.

The syrup-like Extract of Malt, in vast preference to the advertised beers of Hoff, Koch, etc., is said to be really valuable as a nutritive food for infants, dyspeptics, and invalids in general, owing to its containing, in a small compass and in an agreeable, palatable form, all the elements of the grain valuable for nutrition, as albumen, sugar, and phosphates.

But how can this comparatively new remedy be successfully introduced for the benefit of the human race, if instead of being pleasant to the taste and easy to digest, it nauseates the stomach and creates a priori by its offensive odor and unpleasant taste,—an aversion and prejudice against it with the patients who take it, as well as with physicians who prescribe it—if, in short (as Micawber says), the extract of malt is not the extract of malt? And this very thing is our charge against Hirsh's preparation of that name. An examination of the same, upon various complaints of the character mentioned, forced upon us the conclusion that Hirsh's Extract of Malt bears a very distant, if any, relation to barley; that the bulk of it is glycerine, and of such a cheap quality, as ought not to be used in pharmacies—not even for liniments.

It is difficult, as it generally is with organic bodies, to give an exact test for the purity and general quality of the Extract of Malt, but it may be considered a good criterion if a small quantity, heated and burnt in a platinum or iron spoon, over a spirit lamp, issues, as it turns brown, the agreeable, toast-like odor of roasted grain, followed by that of caramel. In Hirsh's extract, the offensive smell of impure glycerine takes the place of the absent odor of the grain.

It may be necessary or advisable to add to the extract, during the warm season, a small quantity, say one-eight, of glycerine to prevent fermentation; but it ought to be pure glycerine, and if so, it will not interfere with the palatability or the efficacy of the extract, nor with the criterion mentioned.

If pharmacists would prepare this extract, they would easily overcome all the difficulties of manufacture, and would furnish themselves with a standard preparation to judge by, whenever they find it afterward more convenient to buy it. The proper formula for making the Extract of Malt having been published by Mr. Albert E. Ebert, in No. 11, Vol. III. of The Pharmacist, it may be here suggested that the manipulations can be somewhat shortened if the pulpy mass, as soon as all the starch has been converted into dextrine and glucose, is thrown into a percolator of proper size with a layer of gravel at the bottom; only a small quantity of the liquid has to be returned before it runs perfectly clear. So much for Malt Extract.

The second article of fraud is a "Strictly pure Cream of Tartar, ground from the crystals expressly for the drug trade," offered by a man who, for a number of years, has been a dispenser of pure drugs and medicines, which business he abandoned for the sake of manufacturing baking powder and the pure cream of tartar. His confiding nature has probably never permitted him to doubt the purity of anything he dispensed, and judging others by himself, he thinks it an easy matter to palm off the product of his manufacture on the profession, there being the strong inducement that he knows exactly what is needed in the drug trade, having been in it himself. This cream of tartar was offered by his agent at less than market price, but being tried with liquor potassæ, it left a sediment of about twenty per cent., which, under effervescence, was readily dissolved by nitric acid, and from that solution precipitated by oxalic acid.

The writer would not have considered this article worth mentioning, trusting in the circumspection of the gentlemen of the profession, if said agent had not exhibited cards of some drug firms who, as he said, had bought from him or promised to buy as soon as they needed any.

Yours respectfully, C. E. CLACIUS.

CHICAGO, April, 1871.

## THE EXTERNAL APPLICATION OF CARBOLIC ACID IN CASES OF POISONED WOUNDS.

BY PATRICK O'CONNELL D'OYLE, L.K.Q.C.P.I.,

Assistant-Surgeon Royal Navy.

The successful treatment, in my hands, of poisoned wounds by the application of carbolic acid to them, leads me to say a few words on the subject. When we come to consider the excessive danger to the patient, and the mortality in cases of poisoned wounds, it becomes our bounden duty (in my opinion) to make ourselves familiar with every mode of treatment, no matter how trivial, likely to be useful and successful. Various as are the modes of their treatment, local and general, the fatal results frequently attending these clearly demonstrate to us that much has still to be learned relative to them. I purpose giving my experiments on fowls relative to the treatment of poisoned wounds by carbolic acid.

During the Niger expedition of 1868, being in Medical charge of H. M. S. *Investigator*, and having to pass through a hostile country, where poisoned arrows and spears were the principal offensive weapons I procured several freshly poisoned arrows. Now, taking some fowls, I stripped the feathers from their thighs, and ran the heads of the arrows through their most fleshy part. The arrow was allowed to remain in the wound rather more than one minute—in some instances as long as ninety seconds. As I withdrew the arrow, I poured liquefied, undiluted carbolic acid into the wound, taking especial care to make it come into contact with every portion of it. A small bandage was now applied over the wound, and the fowls isolated. On one-half of the fowls operated upon—or, more properly speaking, inoculated—no carbolic acid was used, and I found every one of these die in a space of time varying from one to twelve minutes. On the other hand, those I used the acid with lived, and seemed not to suffer from the effects of the poison, although a great deal of discoloration was visible around the wound for several days. This gradually disappeared. None of the fowls that died did so until the withdrawal of the arrow and the exposure of the wound to the air. I must confess that my experiments were very limited, but I can not attribute to chance the uniform results obtained, and therefore I am led to recommend the application of carbolic acid to poisoned wounds.

The following experiment I also made. Having scraped the superficial coating, down to the iron (but taking care not to take any of this), from the head of a poisoned arrow, I dissolved it in ether, and, on adding carbolic acid to this solution, a white precipitate, somewhat resembling albumen precipitated from urine by nitric acid, was thrown down. I inquired very minutely of the native interpreters as to the mode of poisoning their arrows, and the treatment adopted if a native be wounded by one of them. I was informed that some plant, whose name or appearance I could not find out, was obtained, and a decoction of it made; a snake's head reduced to powder was then added to the decoction, the whole boiled down to the consistence of a syrup, smeared upon the arrow-heads and allowed to dry. I am aware that the poison used for spears, arrows, etc., in the towns bordering on the River Niger has been asserted to be a purely vegetable one, but my inquiries lead me to think this is a mistake. I was most particular in seeking and obtaining information on this subject, and in every instance my informants spoke of a snake's head reduced to powder as being added to the infusion. The snake must have been of a poisonous character, and recently killed. Now, as to the treatment adopted. If a native be wounded by a poisoned weapon, some of their antidote is chewed and as quickly as possible applied to the wound, and then a dose of it is swallowed; this, I believe, invariably acts as a powerfully stimulating emetic, and it is upon this action they place the chief reliance. "Suppose he no puke proper he die," said the native interpreter to me; in fact, their experience has taught them the emetic action is the one to be relied on. Human excrement is sometimes used instead of a better antidote, but they only apply it to the wound. Their antidotes, with the exception of the last-named, are of a vegetable character. The poison takes but a very short time to kill. Several natives, who were wounded while we were destroying a village, were unable to reach their boat, although it was distant only a few yards.

In conclusion, I would recommend, in cases or poisoned wounds, the instantaneous application of strong carbolic acid to the part, every portion of the wound being made to come in contact with it; the immediate administration of a strong stimulating emetic, and the subsequent use of stimulants; and suggesting that the value of carbolic acid may depend on its neutralization of the poison, and also its power of preventing decomposition, I may express a hope that this plan of treating poisoned wounds, which, as far as I am concerned, I have never read or heard of before, may prove serviceable on future occasions; and if so I shall consider myself amply rewarded.—*Medical Times & Gazette.*

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# SYRUP OF PHOSPHATE OF IRON AND OTHER SYRUPS CONTAINING PHOSPHORIC ACID.

BY MICHAEL CARTEIGHE.

Of the numerous preparations of iron at the disposal of the practitioner few have in late years acquired more favor than the syrup of the phosphate. First introduced to the notice of the profession by Mr. Greenish in a form more or less opaque, it was not until about ten years ago that it came into very general use. About this time Gale and Schweitzer each read a paper at one of the evening meetings of the Pharmaceutical Society, detailing processes for the preparation of this syrup in a form which should remain perfectly bright and free from deposit. Gale's process was introduced into the British Pharmacopœia of 1867, and since the publication of that volume the demand for this medicine has vastly increased. Its tendency to darken in color after having been kept for some time was soon noticed, and Umney made some experiments with the view of preventing or retarding this change, but the results were not practically satisfactory. T. B. Groves afterwards examined a very old specimen in his possession, and determined the chemical composition of the precipitate, which is formed on long standing. He describes this precipitate as being essentially a compound of iron with phosphoric acid, corresponding to the octocalcic phosphate of Warington. The dark color he thinks due to the production of caramel by the action of the phosphoric acid and iron salt upon the sugar. He also prepared several specimens with a stronger acid, made by himself from amorphus phosphorus, and found that these kept somewhat better than when made according to the B. P.

The necessity of keeping the syrup recently prepared induced me to try a few experiments with a stronger acid, and to advise a shorter process than that of the B. P. This has doubtless already suggested itself to, and been practically tested by, other chemists, but, so far as I am aware, it has not hitherto been published. It is as follows:

### SYRUP OF PHOSPHATE OF IRON.

| | |
|---|---|
| Phosphate of Iron | 96 grs. |
| Water | 9 fl. drms. |
| Syrupy Phosphoric Acid, sp. gr. 1.500 | 7 fl. drms. |
| Syrup | 10 fl. oz. |

Rub the phosphate of iron with the water in a glass mortar, add the phosphoric acid and filter the mixture into syrup.

As thus prepared, it contains the same proportion of iron, about 2 minims less of the dilute acid (25 instead of 27), and rather more sugar than when prepared according to the Pharmacopœia.

The phosphate of iron is made by the B. P. process, and dried at a temperature not exceeding 100° F. The specimens I have found in the ordinary course of trade are not readily soluble in the acid. This want of solubility is, I believe, due to the length of time they have been kept before sale.

I have obtained the best results with phosphate only a few days old, and find it advantageous to make as much as is required frequently.

Syrupy phosphoric acid of sp. gr. 1·500 may now be obtained of any manufacturing chemist, and according to Dr. Watt's table, contains about 50 per cent. of $P_2 O_5$. It is made by the action of nitric acid on phosphorus, the excess of acid being driven off in a platinum vessel.

Manganese is sometimes prescribed with or without iron, and according to Pereira, the former is a useful adjunct to ferruginous preparations, and occasionally a desirable substitute for them.

### SYRUP OF PHOSPHATE OF MANGANESE.

May be prepared in a similar manner with the following ingredients:

| | |
|---|---|
| Phosphate of Manganese | 96 grs. |
| Water | 9 fl. drms. |
| Syrupy Phosphoric Acid, sp. gr. 1·500 | 7 fl. drms. |
| Syrup | 10 fl. oz. |

*Strength*—1 *grain phosphate of manganese and acid equal to about* 25 *minims of the dilute phosphoric acid in each fluid drachm.*

The phosphate of manganese is made in the same manner as the phosphate of iron, substituting sulphate of manganese for the ferrous sulphate.

### SYRUP OF PHOSPHATE OF IRON WITH MANGANESE.

| | |
|---|---|
| Phosphate of Iron | 72 grs. |
| Phosphate of Manganese | 48 grs. |
| Water | 8 fl. drms. |
| Syrupy Phosphoric Acid | 8 fl. drms. |
| Syrup | 10 fl. oz. |

Rub the powders with the water, and the acid and filter into the syrup.

*Each fluid drachm contains* ¾ *grain phosphate of iron,* ½ *grain phosphate of manganese and acid equal to about* 30 *minims of the dilute phosphoric acid, B. P.*

The tendency of modern practitioners of medicine to encourage the exhibition of substances which may assist in the formation of bone, etc., has led to the introduction of the—

### SYRUP OF PHOSPHATE OF IRON AND LIME.

| | |
|---|---|
| Take of Phosphate of Iron | 96 grs. |
| Phosphate of Lime | 192 grs. |
| Water | 8 fl. drms. |
| Syrupy Phosphoric Acid, sp. gr. 1·500 | 8 fl. drms. |
| Syrup | 10 fl. oz. |

Mix the powders with the water in a glass mortar, add the acid and filter into the syrup.

*Each fluid drachm contains* 1 *grain of phosphate of iron,* 2 *grains of phosphate of lime, and an amount of acid equal to about* 30 *minims of the dilute phosphoric acid, B. P.*

The phosphate of lime is made by precipitation from solutions of chloride of calcium and phospate of soda, and dried at 100° F., and should not be kept too long before use. That made from *bone ash*, as the Pharmacopœia directs, is much less readily soluble.

The following formulæ may be useful as an appendix:

### SYRUP OF PHOSPHATE OF ZINC.

| | |
|---|---|
| Phosphate of Zinc | 192 grs. |
| Water | 11 fl. drms. |
| Syrupy Phosphoric Acid, sp. gr. 1·500 | 5 fl. drms. |
| Syrup | 10 fl. oz. |

Rub the phosphate with the water, add the acid and filter into the syrup.

*Each fluid drachm contains* 2 *grains of zinc phosphate and about* 18 *minims of dilute phosphoric acid.*

### SYRUP OF PHOSPHATE OF QUININE.

| | | |
|---|---|---|
| Take of | Phosphate of Quinia* | 96 grs. |
| | Water | 13½ fl. drms. |
| | Syrupy Phosphoric Acid, sp. gr. 1·500 | 2½ fl. drms. |
| | Syrup | 10 fl. oz. |

Mix the acid with the water, add the quinia and filter into the syrup.

*Each fluid drachm contains* 1 *grain of phosphate of quinine and acid equal to about* 10 *minims of the dilute phosphoric acid.*

### SYRUP OF PHOSPHATE OF IRON WITH QUININE.

| | | |
|---|---|---|
| Take of | Phosphate of Iron | 192 grs. |
| | Phosphate of Quinia* | 96 grs. |
| | Water | 7 fl. drms. |
| | Syrupy Phosphoric Acid, sp. gr. 1·500 | 9 fl. drms. |
| | Syrup | 10 fl. oz. |

Rub the powders with the water, add the acid and filter into the syrup.

*Each fluid drachm contains* 2 *grains of phosphate of iron and* 1 *grain of phosphate of quinine.*

### SYRUP OF PHOSPHATE OF IRON, QUININE AND STRYCHNINE.

#### *Easton's Syrup.*

| | | |
|---|---|---|
| Take of | Phosphate of Iron | 192 grs. |
| | Phosphate of Quinia* | 96 grs. |
| | Strychnia (in crystals) | 3 grs. |
| | Water | 7 fl. drms. |
| | Syrupy Phosphoric Acid, sp. gr. 1·500 | 9 fl. drms. |
| | Syrup | 10 fl. oz. |

Rub the phosphate of iron with 5 drachms of the water in a glass mortar, dissolve the strychnia and quinia in the acid, previously mixed with the remaining 2 drachms of water; mix and filter into the syrup.

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* The same weight of quinia, prepared by precipitating an acidulated solution of the *disulphate* by solution of ammonia, collecting, washing and drying at 100° F., may be used, in the absence of the phosphate.

*Each fluid drachm contains 2 grains of phosphate of iron, 1 grain of phosphate of quinine and* $\frac{1}{32}$*nd part of a grain of strycnhine.*

### SYRUP OF PHOSPHATE OF IRON AND STRYCHNINE

May be prepared in the same manner as the last, omitting the phosphate of quinine.

I am conscious of the objections which may be urged against the prescribing of these *compound* preparations, but in the face of the constant and increasing demand for many, it appears to me futile to attempt to discourage them by declining to publish formulæ. Such a course tends to perplex both the medical profession and pharmacists and to the introduction of quasi-secret remedies of unknown, and possibly of uncertain, strength.—*Pharmaceutical Journal*, *London.*

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## THE COMPOSITION OF SECRET MEDICINES.

From a review of Dr. Wittstein's *Handbook of Secret Medicines*, in the *Am. Jour. of Pharmacy*, we extract the following:

The book confines itself, for obvious reasons, to those secret preparations offered for sale in Germany; but we find among them quite a number which are more or less known in this country, and have their birth-place in Germany, Switzerland, Italy, France or England; even a number of American origin are "ventilated" therein, the proprietors of which had "enterprise" enough to introduce them on the old continent.

The articles are arranged in alphabetical order, and a short history is in nearly all cases attached, giving the originator or manufacturer, the diseases which it pretends to cure, a description of the physical properties and style in which it is put up, the retail price, the pretended constituents, the names of the analysts, the true composition, and the actual retail value if made in a respectable apothecary's store. We extract the formulas for a few articles only, which may be of some interest to our readers:

*Coca Pills*, by Sampson, New York. According to Hager and Jacobsen, composed of powdered coca and extract of coca in about equal quantities; value about one-fourth of price.

*Granular Effervescent Citrate of Magnesia*, by Bishop, of London, consists merely of bicarbonate of soda and tartaric acid.

*Pommade des Chatelaines*, a hair invigorator, consists of benzoinated lard and some volatile oils.

*Magnesian Aperient* by Moxon, of England, is, according to Siller, anhydrous sulphate of magnesia 31, carbonate of magnesia 14, bicarbonate of soda 30, tartaric acid 25 parts.

*Swedish Essence of Life* is made also in this country, under various names. As usually made by apothecaries, it is a tincture prepared from 4 aloes, 1 agaric, 1 rhubarb, 1 saffron, 1 zedoary, 1 gentian, 1 myrrh, 1 theriac, with 100 to 120 dilute alcohol. The secret medicine manufacturers usually substitute cheaper articles for the high-priced saffron and rhubarb.

*Hoff's Extract of Malt* has been repeatedly altered in its composition. It is now a good beer, of a pretty constant alcoholic strength of 3 per cent., but varying in the amount of extract between 5.3 and 10 per cent. The beer sometimes contains an infusion of a bitter herb (buckbean, blessed thistle) and of the bark of *Rhamnus frangula.* According to one original recipe, beer was mixed with a small quantity of strong infusion of marsh mallow root, coriander, staranise, and grains of paradise, and with some simple syrup, glycerin, oil of lemon, oil of orange, and beer coloring (caramel). The consumers can make it for, at most, one-sixth of its price.

*Zimmerman's Extract of Malt*, which, like the former, comes likewise from Berlin, is similar in composition.

*Matico Injection*, by Grimault, of Paris, for gonnorrhœa, is made, according to Bjoerklund, by dissolving 4 grains sulphate of copper in 8 oz. infusion of matico (from ½ oz.)

*Syrup of Horseradish*, by Grimault. Hager gives the following directions: 50 p. each of fresh scurvy, grass, buckbean and watercress, 60 of horseradish, 40 of fresh orange berries, are infused with 3 cinnamon in 50 p. white wine, and after a day expressed; 250 p. sugar are dissolved in the filtrate.

*Iodinized Syrup of Horseradish*, by Grimault, contains 10 iodine and 5 potassium iodide in 8,000 of the former.

*New York Pills* by Sampson, of New York. The 1½ grain pills consist of powdered coca 25, extract of coca 30, powdered iron 35 parts.

*Brandreth's Pills* contain resin of podophplum, inspissated juice of poke berries, saffron, cloves, oil of peppermint.

*Holloway's Pills* are composed of aloe, myrrh and saffron.

*Morrison's Pills*, 2½ grains each, consist of aloe, cream of tartar and colocynth; another kind contains the same ingredients, besides gamboge.

*Radway's Ready Relief*, according to Peckolt, is an etherial tincture of capsicum, with alcohol and camphor.

*Radway's Renovating Resolvent*, a vinous tincture of ginger and cardamom, sweetened with sugar. (Hager and Jacobsen.)

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# ON FERMENTATION.

BY PROFESSOR A. W. WILLIAMSON, F.R.S.

*Before the Society of Arts. Reprinted from the Pharmaceutical Journal, London.*

## LECTURE II—CONTINUED.

First, I will take the case of alcoholic fermentation, as being the case best known. The ferment consists of little cells—which I hope I shall be able to show you at our next meeting—each one containing several chemical compounds, but itself a little living being. I will not say at present whether they are animals or plants. When you have these little organisms in water, or sugar, or in any moist substance, they are constantly, and of necessity, undergoing decomposition. You may arrest the decomposition by various agents, but if you do so, you kill them, or suspend their activity as yeast. No case is known to us of their acting like yeast without undergoing at the same time a process of chemical decomposition,—being broken up into simpler substances than those which were contained in them. I pointed out, last week, that the sugar which is being decomposed by the yeast is by that process being broken up into substances which were contained in it, and that was what Liebig noticed. He said that this yeast is a substance which tends to decompose,—it is breaking up into simpler substances, and it induces in these particles of sugar which are in contact with it a decomposition similar to its own. The action which it is undergoing is contagious, and passes over to the contiguous particles of sugar; and he adduced cases like that of oxygen, as affording analogies among simple well known bodies. I think what I have said with regard to the case of oxygen will be sufficient to show you that in those simple cases the idea of contagion is certainly not applicable.

A foreigner, who was describing some time ago the luxuriance of the crops in America, spoke of a bushel of *mice* being sown in a field, and a hundred bushels of *mice* being reaped. Of course, what he meant to say was *maize*, or Indian corn; but I am reminded of that anecdote by the necessity I am under for a moment of asking you to consider for a while some living beings under their general functions only. Suppose you had a bushel of actual English mice, and you put them into a granary full of corn. There clearly would soon be a great change. You are supposed to know nothing more about the particular organization of these little beings than you know about the particular organization of the little yeast cells. You know that these little things eat grain, and that in place of the grain which they eat there appear various prodcts of decomposition, which can be easily collected and examined. They give off carbonic acid, and so forth, and if you examined the state of that granary after a time, you would find a chemical change, or rather a set of chemical changes, going on in the organisms of these mice. The substance of which they consist would be actually wasting away; they would be giving off carbonic acid, and nitrogenous and other products. And if you also examined the state of the corn which was there at first, you would find that it finally passed over into these same products; and I say that the theory of contagious action is as much applicable to the action of the bushel of mice in the granary full of wheat, as to the action of the yeast cells upon a solution of sugar. There is in the one case, as in the other, an assimilation by the living organism of the material upon which it acts. The materials undergo certain changes, of which the general results are known to us, but of which the particulars are, I may say, in the main almost completely unknown. As to the processes by which these products are formed, it is as well to say that we do not know them. We know a little here and there about them, but it is nothing compared to our ignorance; therefore the resemblance is the more striking, and if we were to believe in the contagiousness of chemical action as applied to the case of the assimilation of sugar by a ferment, and say the ferment gives off alcohol and carbonic acid, and that sugar is also resolved into alcohol and carbonic acid we should really be describing in its general features a process analagous to that which I have just now mentioned; such a general analogy would be readily admitted by those who go into the particulars of the process, but I think it is of particular importance to have in addition to it something more practically useful to guide us in understanding chemical reactions. For that purpose I will take one or two chemical reactions of an exceedingly common kind. For instance, I will again take that chromic acid solution which I just now employed. Here you see is the green residue which I told you would be produced; I again take some of this chromic solution, throw some of it into water in this jar, so as to visibly tinge the water red; I will slightly acidulate the liquid by oil of vitriol, and I will then pour into the mixture (which I will describe as chromic acid dissolved in water, for the potash which was present is taken away from the compound by the sulphuric acid), a substance which I will merely describe as being greedy of oxygen, sulphurous acid. If Liebig's theory of contagious action were generally true in chemical action, you would no doubt expect that this sulphurous acid, in taking up oxygen, would make the chromic acid also take up oxygen. It is quite possible for the chromic acid to do so, for that blue substance which we had in this jar at first was nothing but chromic acid with oxygen added to it. But instead of this, we shall have at once a reduction of the chromic acid to deep green, which I dare say appears to you almost black. It is precisely the same thing as that pale, dirty green which you saw before, but in its concentrated state. There is no oxygen taken up by the chromic acid, but it at once loses oxygen. This sulphurous acid wanted to combine with oxygen, and it tore away at once some of the oxygen from the chromic acid, and there was in this chromic acid a process, not similar to that which the sulphurous acid underwent, but a process precisely opposite to it—one combined with oxygen while the other lost oxygen,—and if you examined the liquid, you would find that the sulphurous acid which took part in the process, and has taken up oxygen, is now in the form of sulphuric acid. Again, I have here some granulated zinc, which will very easily evolve hydrogen, particulary when its activity is stimulated by throwing a little oil of vitriol on to it. After adding a little water, I will throw in a little oil of vitriol, so as to get an evolution of gas. Then I have here a solution which I think must look black to you, except at the edges, which is a solution of a beautiful salt called permanganate. It is used for deodorizing certain fetid water, and I might compare it to the chromate I was using just now. It consists of an acid of the metal manganese. If I throw some of that into the mixture which I have just prepared, and leave it for a short time, and then examine it, we shall find that, instead of being induced to give off hydrogen like the other body, which is doing so vigorously, we shall find it will do the opposite, and will combine with hydrogen; and the color which belongs to it, and which can be recognized so easily, will disappear, because hydrogen will be taken up by its oxygen, and it will be reduced and brought down to a substance containing comparatively little oxygen. There, again, as in the previous case of the chromic acid, we find that there is a kind of chemical polarity in the general mode of action, that the one substance acted upon does precisely the opposite of the other. There is no tendency in this case to do the same thing, but the two substances acting upon one another do precisely the opposite, the one taking up what the other loses. Not only is that the case in the instance of the action which I have mentioned here, but in a great number of other cases of considerable interest and importance,—bodies which act chemically with considerable energy when allowed to do so, are prevented by others from so doing when those others are trying to do the same thing. If, for example, we put metallic copper into nitric acid, the copper would dissolve with immense energy: it would undergo what I might call a process of combustion. Again, if I put mercury in contact with the acid, the same thing would occur; it would be dissolved almost as rapidly as the copper. But if I put the two together into nitric acid, the copper prevents the mercury from undergoing combustion; and so far from encouraging it to do the same thing, it actually takes from it the power which it possessed before of undergoing a combination of that kind. And more than that, if I take mercury which has been burned—a solution of mercury in the form of corrosive sublimate,—and put copper into it, the copper will actually unburn it, or make it come back again from the point at which it had got, and throw down the metal. You can see the process which takes place; on putting a strip of clean red copper into the solution, it becomes grey, and throws down the mercury from the solution. So far from encouraging the mercury to oxidation, it makes it do the opposite to that which it otherwise had a tendency to do.

Again, I will take some of this solution of copper—it ought to be some of the very solution which is being made here, where copper is being dissolved at the expense of mercury—and if I put into it a piece of common iron, perfectly clean and white, it will very speedily combine; and I cannot express its functions in combining better than by saying that it will make copper uncombine, for the copper which was burnt is now being unburnt.

If we go carefully, with the knowledge of their particulars, through the best known chemical processes, we find that there is, as a rule, a force at work which I might describe as polarity—a tendency among contiguous particles which are acting on one another to assume functions which can be best characterized as being opposite to one another. Whatever the one is doing, the other is doing as nearly as possible the very opposite of it, and any tendency to do like work I know not of. There are, however, cases which would appear to be favorable to the notion of contagious chemical action. If I blow out that gas-burner, still letting the gas escape, and then bring near to it a burning splint, it will set fire to the gas, and the same with the candle-wick if I bring close to it a burning match—the match, which is burning, communicates to the wick the process which it is undergoing,—but the explanation is this: it does so merely because of the high temperature which it has attained. If by any other process, such as concentrating the rays of a powerfully heated surface by means of a lens, I raise the temperature of the gas to that point at which it is capable of combining with the oxygen of the air, it will do just as well. The accident that the high temperature is communicated by the burning splint has nothing to do with the process.

(*To be continued.*)

## EDITORIAL.

### MEDICAL AND PHARMACEUTICAL ETHICS.

The medical profession in some parts of the country is much exercised over alleged interferences with their high prerogative on the part of apothecaries; so fearful is this faction lest a modicum of their "honorarium" (we use the term after reading the Code of Ethics of the Amer. Medical Association) pass into the till of the same grasping apothecary who may dare suggest a remedy for a toothache or a wart, that grave resolutions of condemnation and warning have been brought before certain medical societies. These notes of alarm call the offenders to account, threatening them with dire punishment by a "withdrawal of support" if the alleged practices be persisted in.

We are no apologist for apothecaries who prescribe, and discountenance such a course as much as any body of men could do, but after a very considerable amount of observation in different sections of the county, we must say that this is one of the very last charges that can be brought against the druggist. Apothecaries, as a class, unite in condemning a practice which is made a subject of comment in the code of ethics of every pharmaceutical society, so far as we are aware. We quote a paragraph relating to this question: "As the practice of pharmacy and the practice of medicine by the same individual involves pecuniary temptations at enmity with a conscientious discharge of duty, we consider that the members of this association should not unite the two professions." Where there is cause of complaint it will usually be found that a *physician* is uniting with his profession that of the *dispenser*, the result, of course might be anticipated.

We think the medical profession, before pointing out to their co-laborer—the apothecary—the strict path of professional rectitude, should direct some of their energy to the enforcement of their code of medical ethics among themselves. We commend to their consideration the scriptural injunction, "First cast out the beam out of thine own eye, and then shalt thou see clearly to cast out the mote out of thy brother's eye."

While we have the highest appreciation and regard for the medical profession as a body, we are painfully aware that many individual members, to whom a good professional standing is accorded, indulge in unprofessional practices, which should exclude them from affiliation with their medical brethren, and forfeit the respect of the community. The charge which we particularly prefer is doubly obnoxious, because its successful execution requires the connivance of an apothecary, making the latter *particeps criminis*, equally guilty, bringing equal discredit upon the profession of pharmacy, and injuriously affecting the business of its more honorable members.

We allude to the iniquitous system of ordering articles in prescription by fictitious names or terms which must be unknown to all but the prescriber and dispenser, who understand by virtue of a preconcerted arrangement.

Now, but one reasonable construction can be put upon such action; to wit, the parties concerned in the transaction, doctor and apothecary, are in compact from pecuniary considerations, which may be stated thus: the former, agreeing to send his prescriptions exclusively to the latter, is to receive a certain percentage of the amount charged for each prescription dispensed; but, as patients have the privilege, which they will occasionally exercise, of procuring their medicines wherever individual preference may elect, it not unfrequently happens that the doctor's prescriptions fail to reach his confederate in crime, and both are thus deprived of their anticipated gains. In order to entirely prevent such an occurrence, the physician decides to write in hieroglyphics, unintelligible to any save his confederate, and thus the patient is forced to patronize the doctor's accomplice, paying invariably the wages of the latters sin, in addition to the full value of the medicine, if, indeed, an extortionate price be not demanded besides; for one guilty of a greater crime may reasonably be considered capable of a smaller one.

What remedy is there for this terrible abuse of confidence, for this secret robbery of unsuspecting patients, and injury to all honorable members of the medical and pharmaceutical professions? We know of but one,—exposure to professional and public scorn and contempt—and this we believe may be effected if apothecaries will take the work in hand as a matter of principle and justice.

We would suggest rules of action something like the following: 1st. When a prescription is received which is unintelligible from the characters or terms used, the apothecary, acting on the legal presumption of innocence until the reverse is proven, should send a copy of the prescription with a written request for information, to the druggist to whom the original may have been addressed. If this should not elicit a satisfactory reply, a similar application should be made to the prescriber, and if an explanation be still refused, a *traced* copy of the prescription should be retained, while the original is returned to the customer, with an explanation in accordance with the facts. Secondly.—If the prescriber be a member of any medical society, county, state, or national, at the first opportunity, the subject should be brought before its officers and members, with the traced prescription, and the entire correspondence which it elicited. Upon these facts the society, if it have any self-respect, must take action, and this action if in accordance with all ethical considerations and equity, must be to reprimand or expel the offending member.

The course we have indicated would be dignified, would meet the approval of all right-thinking physicians, and finally, would, in our opinion, do much towards breaking up a most pernicious practice, and the meeting of justice to some members of the medical profession who now occupy high positions and dictate to their patients *exactly where, only pure medicines and careful dispensers can be found.*

## THE CALIFORNIA PHARMACEUTICAL SOCIETY.

The twenty-first meeting of the California Pharmaceutical Society was recently held in San Francisco. Mr. Calvert (the President) in the Chair. Owing to the resignation of Mr. Perkins, who had removed to a distant State, Mr. G. G. Burnett was appointed Recording Secretary, pro tem.

Mr. Steele, the Corresponding Secretary, presented to the meeting a large and interesting correspondence. Among other letters, those from Professor Maisch, of Philadelphia, and Mr. Tufts, the treasurer of the American Pharmaceutical Association, were read.

The report of the Executive Committee was read and approved. Mr. Steele next read the Constitution and By-Laws of the Society, amended with a view to speedy incorporation. These were approved, article by article, and the Executive Committee empowered to take immediate steps for the incorporation of the Society.

The following is the report of the Exectuive Committee:

The Executive Committee of the California Pharmaceutical Society herewith present the Constitution and By-laws of the Society, amended with a view to the speedy incorporation of the Society, according to the laws of the State of California.

The Pharmaceuists throughout the country are gradually awakening to the importance of a thorough practical and scientific pharmaceutical education, in order to place the practice of Pharmacy where it properly belongs—among the learned professions, a rank already accorded to it in most parts of Europe—and as to further develope this sentiment among our fellow pharmaceutists was the prime motive in organizing the California Pharmaceutical Society we regard it the duty and interest of all Pharmaceutists to identify themselves with us.

That in order to elevate the standard of pharmaceutical education in our midst an institution aiming at the objects expressed in our Constitution is absolutely necessary, we think all must concede.

The practice of pharmacy has been placed under legislative restriction in most parts of Europe, and, as is well known, sumptuary and restraining laws have been passed recently by the Legislatures of various States of the Union; and a regard for our own reputation would seem to require us to prepare and offer a bill providing for the examination and registration of apothecaries to the Legislature at its next session.

Knowing it to be the will of our organization that we enroll ourselves among the incorporate bodies of the land, that thereby we may strengthen and increase our influence and provide for our future prosperity; and believing that our action herein is but the prelude to the early establishment of a College of Pharmacy, we offer this report with a sincerely expressed hope that the wishes of our hearts in the matter of the elevation of the character of the pharmaceutical profession in our State may be gradually and effectually accomplished.

[Signed]
William Simpson,
William Geary,
W. T. Wenzell,
Wm. E. Mayhew,
James G. Steele,
*Committee.*

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Notices of New Publications.—Chemistry: General, Medical and Pharmaceutical, including the chemistry of the U. S. Pharmacopœia. A manual of the general principles of the science, and their applications to Medicine and Pharmacy. By John Attfield, Ph. D., F. C. S., Professor of Practical Pharmacy to the Pharmaceutical Society of Great Britain; Honorary member of the Colleges of Pharmacy of Philadelphia, New York and Chicago, etc., etc. From the second and enlarged English edition. Revised by the author. Philadelphia: Henry C. Lea: 1871. 8vo. pp. 552. Cloth, ——; Leather, $3.25. For sale by S. C. Griggs & Co., Chicago.

On two former occasions, as the English editions appeared from the press, we have noticed this valuable work, expressing the hope that it might be republished here, and be accessible to our readers, and to students of pharmacy and medicine.

Prof. Attfield, at the urgent request of professional friends in this country, consented to revise his work and adapt it to the Pharmacopœia of the United States, and the result we have before us in a handsome volume of 552 pages. To give an idea of the scope and character of the work, we cannot do better than quote from the preface:

"From other text-books it differs in three particulars: First, in the exclusion of matter relating to compounds which at present are only of interest to the scientific chemist; secondly, in containing the chemistry of every substance recognized officially, or in general practice, as a remedial agent; thirdly, in the paragraphs being so cast that the volume may be used as a guide in studying the science experimentally.

"The order of subjects is that which, in the author's opinion, best meets the requirements of medical and pharmaceutical students of Great Britain and America. Introductory pages are devoted to a few leading properties of the elements. A review of the facts thus unfolded affords opportunity for stating the views of philosophers respecting the manner in which these elements influence each other. The consideration in detail of the relations of the elementary and compound radicals follows; synthetical and analytical bearings being pointed out, and attention frequently directed to connecting or underlying truths or general principles. The chemistry of substances naturally associated in vegetables and animals is next considered. Practical toxicology and the chemical as well as the microscopical characters of morbid urine, urinary sediments, and calculi are then given. The concluding sections form a laboratory-guide to the chemical and physical study of quantitative analysis. The appendix includes a long table of tests for impurities in medicinal preparations; also a short one designed for use in prescribing and dispensing. * * *

"The chemical notation of the work is in accordance with modern theories.

Equations illustrative of pharmacopœial processes have a name attached to each formula.

"Chemical nomenclature has been modernized to the extent of defining the alkali-metal and earthy salts, as those of potassium, sodium, ammonium, barium, calcium, magnesium, and aluminum, instead of potash, soda, ammonia, baryta, lime, magnesia and alumina. The author confidently believes that this change, now adopted by all prominent writers on chemistry, will be accepted and become popular with pharmacists, as it is a step in the direction of simplicity and consistency, and involves far less hypothesis than is contained in the old system."

Chemistry, as usually taught in our medical and pharmaceutical schools, is of an abstract rather than an *experimental, practical* nature, as it should be, in order to become available to the student in the prosecution of his chosen calling. Chemical philosophy and the principles of chemistry, however valuable as means of mental discipline, are not taught with the latter end in view, but for their future applications in the advancement of the healing art. Students cannot acquire a thorough knowledge of chemistry by any didactic course, but must engage in it experimentally before principles and reactions can be indelibly fixed in the mind, serviceable for any emergency. Though we have many and excellent text-books, they do not present the subjects in proper order and sequence for experiment, or do not indicate to the operator the approximate quantities of the substances used; and finally, the student, supposing that many facts can only be demonstrated on a large or expensive scale, is discouraged from undertaking the practical study of the science.

A text-book arranged to overcome these objections, and lead the student from fact to fact, firmly impressing each upon his mind, has long been wanted. Many medical schools have provided laboratories where students may pursue a practical course on chemistry, consisting usually of practice in analytical chemistry, useful certainly, but by no means the most important experience to have had. We hold that a thorough acquaintance with the composition of medicinal chemicals and their modes of preparation, and the means of detecting adulterations, is of the greatest importance, and this knowledge should precede or accompany instruction in analytical chemistry. We heartily welcome, therefore, Attfield's chemistry, as a guide for just such a course as we have indicated; it fills a vacancy that has hitherto existed in the literature of pharmaceutical chemistry, and in addition gives a complete course of analytical chemistry, and the chemistry of the animal secretions.

Wherever practical chemistry is taught (and it should be in every college), Attfield's manual will be found not simply useful, but indispensible. We regard it as by far the best work of the kind that has come under our notice, and as such we heartily commend it to our readers.

YEAR BOOK OF PHARMACY, AND TRANSACTIONS OF THE BRITISH PHARMACEUTICAL CONFERENCE, HELD SEPT., 1870.—This volume is published by authority emanating from the British Pharmaceutical Conference, and while it is not intended to be the record of proceedings of that body, yet it practically answers that purpose without attaining in any particular to the usefulness or permanent value of the annual volume of Proceedings of the A. P. A. The work is a sort of melange, purporting to represent the condition and progress of pharmacy everywhere; in this we can in fairness only term it a failure. The chapter devoted to American pharmacy could hardly be a less truthful record, indicating either a sad lack of information, or a studied effort to disparage the labors of American pharmacists.

We are disposed to charity and therefore conclude that the unfortunate illness of the appointed editor, Mr. John Cargill Brough rendered hasty work a necessity and that the best was done which could be under the circumstances. We sincerely hope that the future "Year Book" may more nearly represent the yearly advances made in our ancient art.

We would earnestly recommend that in future no effort be made at classification, or that it be made according to some understood rule, as the volume before us would puzzle the oldest book-worm extant.

We would not have our readers think that this work is without value; it contains many contributions to science which we are glad to find collected under one cover.

The autobiographical notice of Mr. Henry Deane, of Clapham, brings the venerable head of this father in pharmacy fresh to our mind, and the notes cannot fail to be of benefit and encouragement to the rising generation of apothecaries.

We are glad the Conference has commenced the publication of a Year Book and trust it will be continued with a comprehensiveness so entire as to leave nothing to be desired as a *resume* of pharmacy.

A BARGAIN.—The furniture and fixtures of the late "Palace Drug Store," of Milwaukee, are offered for sale cheap—delivered and put up if required. Address J. M. MORTON, 400 E. Water Street, Milwaukee, Wis.

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## CORRESPONDENCE.

TO THE EDITOR OF THE PHARMACIST.—DEAR SIR:

We are pleased to note the growth of interest in Microscopy in this city. The value of the microscope as an educational adjunct, and invaluable auxiliary in most scientific research, is now universally recognized. The Annual Reception of the State Microscopical Society, held in March last, was a strong evidence of the increased taste for this branch of study; about three times as many good instruments being on exhibition as at the reception of 1869, there being not less than one hundred and twenty instruments on exhibition, bearing the names of the principal manufacturers in this country and Europe. The first reception of the Society (1869), was held at a private residence, the number of invitations being about five hundred; that of this year was given at one of our largest public halls, the attendance being about three thousand. The arrangements were of the most ample kind, each guest being furnished with a plan of the hall, a programme, and a complete catalogue of the objects exhibited; and a more enthusiastic assemblage we think was never before gathered in Chicago. Of the objects exhibited, we can speak in terms of the highest praise, especially the botanical specimens prepared by members of the Society. We also noticed pathological and anatomical slides, prepared by some of the members, which were remarkably good; showing skill in the mounting and preservation of objects, which would be creditable to members of many older societies. The regular meetings of the Society have been well attended during the past session, something of interest being presented at each one. The number of working members has been steadily increasing during the past year, and at the present time the Society may be considered as one of the most promising in the United States.

At a recent meeting of the Society, the consideration of "test-objects" for the higher powers, was the principal matter for discussion, and, from a variety of illustrative objects exhibited, we may select two for description, viz: The "Podura Scale," exhibited by Mr. Joseph Beck, of London; and Nobert's Test-Plate, exhibited by Mr. R. B. Tolles, of Boston.

The Podura Scale is now used as a test for the practical working powers of an object glass, and, for that purpose, is, according to the highest authorities, the best object known. It was first used as a test-object by Mr. Thomas Carpenter, of Tottenham, England, about fifty years ago, and nothing more strikingly illustrates the great advance made in the manufacture of objectives, than the difference between the drawings published by Goring and Pritchard, in 1831, and the appearance of one of the scales, under a good lens of the present day. The insect, from which the scales are taken, belongs to the family *Poduridæ*, commonly known as Springtails, and has the specific name—*Lepidocyrtus curvicollis*. This species may be readily distinguished from the numerous other scale bearing *Poduridæ*, by its peculiar manner of carrying its head, bent downward and inward. This family of insects is generally found in moist places, such as, the earth in flower-pots, the floors of cellars, and under sticks and pieces of decaying wood. Most of the species are distinguished for their power of leaping when disturbed; and, if not secured quickly after discovery, are almost sure to escape, amid the surrounding dirt and rubbish. When captured and placed under the microscope, the specimen is seen to be covered by scales which overlap each other like slates on a roof, and which may be easily removed by gently rolling the insect on a glass slide, with the point of a needle or a camel hair brush. The scales which adhere to the slide being examined with a moderate power are seen to be irregular in size, the larger ones being generally selected as the tests. The appearance of the scale, under a power insufficient to define fully the test-marks, is that of a piece of "watered" silk—the markings seeming to be disposed in wavy lines across the surface of the scale. The true test-marks are, however, fully brought out by a good glass of one-fifth inch focus and upwards, and have the appearance of a number of exclamation points without the dots (ꜝ) arranged in longitudinal lines.

The structure of this scale has been the occasion of much controversy among microscopists, on account of the varying appearances produced under different modes of illumination. The lines of marks are undoubtedly ribs of the scale: this is clearly proved by the experiment of Mr. Wenham, described in the *Monthly Microscopical Journal*, No. XXI., and that of Mr. Joseph Beck, described in No. XXIII. of the same journal. Our own observation leads us to regard the above as the correct definition of the structure of the scale. In addition, we would say that we have found many of the allied species in this neighborhood, and have no doubt that the *curvicollis* may be found if specially looked for. The markings were shown by Mr. Beck with a one-eighth objective of 140° angular aperture, which gave a very clear definition of the so called "exclamation points."

As a test for high angled objectives, the most reliable is the Nobert test plate, which consists of a number of groups of lines ruled on glass and diminishing in size from the first to the highest group.

The Nobert plate as now issued, consists of nineteen bands of lines ruled on the under surface of a thin glass cover, which may be mounted either by cementing by its edge to a thin glass slide, or to a circular piece of thin glass which is then mounted over a round aperture in a piece of burnished brass three inches long by one wide.

On both forms of the nineteen band test-plate, the lines are divided into bands or groups of lines, each of which is about one two-thousandth of an inch across and one-third of an inch long. Each band is separated from its neighbor by a space somewhat narrower than the bands themselves, except the spaces between the third and fourth, the seventh and eighth, the eleventh and twelfth and the fifteenth and sixteenth bands, which are a little wider. The bands are thus divided by means of the wider spaces, into four sets of four bands each, and one which consists of the first three only. The total breadth of all the bands is about one-fiftieth of an inch. The lines of the first band are intended to be the one-thousandth of a Paris line apart, those of the second, the one fifteen-hundredth; those of the third, one two-thousandth, and so on; those of the last or nineteenth band being the one ten-thousandth of a Paris line apart, counting from center to center of each line, or about 112000 to the English inch.

These lines are ruled by M. Nobert, of Barth, Pomerania, in a manner which he keeps secret. It is said that he does the ruling in the night, after every one but himself has left the factory, and it is supposed that a minute spark of diamond is used, connected with delicate machinery, working on the same principle as the machine for microscopical writing, invented by Mr. Peters, of London. The lines in the bands up to the eighth, are remarkable for their regularity, but above that each line seems like a series of short scratches, as if it were impossible to maintain an equal pressure throughout the entire length of the line on account of its extreme fineness. The plate exhibited by Mr. Tolles was of the first form, and was first placed under a one-half inch objective, which showed all the bands in the field and the lines resolved in the first five. The plate was then adjusted under a one-tenth objective, immersion, of Mr. Tolles' make, and the lines in the nineteenth band were clearly resolved. This was the first time the resolution with the one-tenth objective, has been effected in public, and, taking into consideration the number of persons present, and the consequent "jar" attending, was highly creditable to the manipulative skill of Mr. Tolles. The resolution was witnessed by all those present at the meeting. The lines in the nineteenth band were photographed in this country, for the first time, by Col. Dr. Woodward, of Washington, using an immersion one-sixteenth inch objective, by Powell & Lealand. The resolution, however, had been effected sometime previous, by Mr. Charles Stodder, of Boston, who, we believe, claims to be the first person to have resolved the nineteenth band. Yours, very truly, LENS.

THE PHARMACIST

AND

CHEMICAL RECORD.

VOL. IV. CHICAGO, JUNE, 1871. No. 6.

# REPERCOLATION.

BY R. ROTHER.

The art of percolation is based upon the theory of displacement, and by reason of its superior simplicity, elegance and convenience, has almost completely superceded the established method of exhausting drugs by maceration and expression.

The important process of filtration is the primary form of percolation, which, in its technical development, has assumed the prestige of an art and culminated in the incomparable method of repercolation.

Repercolation is not by any means a new invention, but merely a well known operation, rendered universally conspicuous through the unequalled advantages it presents for the production of fluid extracts. However, modern percolation and repercolation although fundamentally similar to are yet practically distinct from the like named methods of the past.

The intensely interesting and much contested question of fluid extracts, originated mainly in the inadequacy of the officinal formulas. But the recently promulgated theories on percolation and standards of strength now threaten to revolutionize the entire character of this class of preparations.

Simple percolation gave the great impetus to the unlimited introduction of this superb class of liquid representatives of vegetable materia medica.

But experience repeatedly demonstrates that a single percolation does not yield a percolate whose concentration of medicinal power is within the desired limits; hence the necessity for the subsequent expulsion of part of the menstruum by evaporation, and as this involves the deterioration of the product, and sacrifice of much valuable menstruum and time, without the introduction of a complicated system of mechanical appliances not within the reach or inclination of all pharmaceutists, other methods and standards have been adopted or proposed. It is laid down as a maxim universally conceded by the best authorities, that simplicity in all operations and combinations should be a leading endeavor. But with the pharmaceutist it has additional weight by reason of pecuniary considerations, and it is not more a duty of the pharmaceutist to be accurate than it is a necessity to be expeditious. But, nevertheless, it is plainly evident that most laboratory operations involving much time and labor, can be more advantageously conducted by extending the time and economizing the labor whenever this alternative occurs. Now, repercolation is not only accurate when properly carried out, but by its great simplicity excludes the complications of apparatus for saving the menstruum, the consumption of fuel for evaporation, the constant and laborious attention and the injury to the preparation through long exposure and heat, by a limited extension of time and the application of a moderate amount of skill, labor and attentiveness.

In the question of fluid extracts, complications are not only to be combated in the methods of manufacture, but also particularly in the manner of composition and standard of strength. The term itself barely expresses their true character, and by all means a more proper nomenclature should be chosen.

A fluid extract, in the definition of the term, should contain the entire medicinal virtue of a troy ounce of the crude drug in a fluid ounce of the preparation, though officinally there are some exceptional cases of but half this strength. Therefore, upon a simple and rational plan, a fluid extract is merely the liquid representative of the crude material of the same strength and quality. This taken in a strict sense, however, would be regardless of volume which must necessarily differ with the material or menstruum employed,—that is, 480 grains of the liquid, embodying the medicinal virtue of 480 grains of the crude drug. The term extract brings to mind a body of firm consistence, but a liquid or fluid extract may be assumed as a liquid of any consistence, either thick or thin, without definite medicinal power, this being always variable and uncertain as a determination of the active principles at the present time, with our limited knowledge and means of industrially assaying crude vegetable drugs even in an approximate degree, is altogether beyond question. We have no safe alternative, in the majority of cases, beyond the guaranty obtained through the selection of a good material in the crude state, whose physical characters should be an indication of its proper quality for the purpose intended.

This is, in the writer's estimation, the only true basis and resort at present. All vegetable medicinal substances, and also those of animal origin, are not always of the same medicinal strength in the same kind, but variable within certain limits; this likewise holds good for all the different constituents of such drugs, so that even the relative proportions of the various components in any two samples of the same species will differ, and often widely. It has been conclusively shown that the fresh plant, when collected at the proper season and age, always yields the greatest quantity of its peculiar active principle in the purest condition, with but very rare exceptions, and that this diminishes and changes in physical and chemical characteristics upon drying of the drug, by reason of its attenuated and exposed condition, consequent upon the evaporation of the protecting juices, and the subsequent oxidizing influence of the atmosphere. Simultaneously with this change, the inert and cumbersome, so called, extractive increases by a similar action, until finally the activity altogether disappears, and only extractive and other inert matters remain. It is palpably evident then, as we possess no ready and universally applicable methods of assaying crude drugs of this kind by a determination of the alkaloid, or whatever the active principle or principles may be, which are usually a quantitatively minute part of the whole, there remains no recourse but a knowledge of vegetable materia medica, aided by good judgment in the selection of a proper material. As a process of assay based upon the quantity of inert and variable extractive, would be a proposition too ludicrous for even the most untutored to maintain. For a simple and impressive illustration of which, let the assaying of opium suffice. Notwithstanding, however, the newly proposed and eminently ingenious method of standardizing, based upon a constant difference peculiar for each fluid extract, which in conjunction with the necessary data indicates the total amount of solid matter in solution, would be an admirably convenient and tolerably accurate means of determining the rate of exhaustion, were it not for the same author's experimentally established and generally received conclusions that the exhaustion of the activity is entirely independent of the accumulations of extractive, so much so that the gradation of color in the various percolates would practically form an equally correct estimate of exhaustion.

It lies not within the aim of the writer here to enter upon a dissertation on weights and measures, but it is a striking fact that our system of weighing and measuring is most seriously arbitrary and distressingly irrational. The starting point for the standards of all systems of measurement is a linear unit; from this is derived surface, then volume, and finally weight. The unit of weight rationally, is derived from a cubic unit of distilled water, at fixed thermometric and barometric indications, usually at a temperature of 60° Fahrenheit, with the barometer at 30 inches; but more appropriately at the maximum density of water at the normal barometric pressure. Though our wretched system is incapable of such meritorious simplicity, a great pressure has been exerted, and especially of late, to discard measures of capacity altogether, and employ weight only. This method has long been in vogue in Europe, scientifically, pharmaceutically, as well as commercially. Great as are the numerous advantages of apportionment by weight, it still rests and is entirely dependent upon volumetric determination. Measurement or weighing by volume is so useful an adjunct to investigative science, that the exceedingly accurate and expeditious method of volumetric analysis has wonderfully limited the range of the ordinary tedious gravimetric process. Then, in behalf of American pharmacy, may the admirable and convenient system of measurement by volume never be entirely discarded. If the strength of a liquid product resulting from an officinal process is to be regulated by weight, it becomes immediately a necessity to know its comparative strength by volume, and consequently measure of capacity must be resorted to. Then there is positively nothing gained, but instead an inextricable confusion is created unless the balance is made subservient to the guage by retaining the original volumetric ratios, because liquid medicines are never administered by weight.

There should exist a closer relation between our weights and measures. While we are anxiously anticipating a universal system of metrology, we uselessly burden ourselves with two divisions of weight. The lowest denomination, grain, being common to both, the higher denominations of the one become totally superfluous and actually absurd; a single system unsatisfactory as that is seems abundantly ample, therefore let the least consequential one be ignored. The avoirdupois pound and ounce are in general use, whilst the same weights troy are found only occasionally as mere curiosities. Large quantities in troy weight are always determined by reduction to pounds and ounces avoirdupois. The avoirdupois pound contains 7,000 grains, and the ounce 437½, and as the troy ounce contains 480 grains, their difference is 42½ grains, or slightly less than one-tenth of an avoirdupois ounce. Therefore, to obtain any number of troy ounces by means of avoirdupois weight, we simply have to add to a like number of avoirdupois ounces one-tenth as many more as the required number of troy ounces; this gives the trifling excess of one and a fourth grains for every ounce, which, however, barely compensates for the loss incurred by manipulation.

A fluid ounce of distilled water at 60° Fahrenheit weighs 455.7 grains, which is divided into 480 minims. The difference between a fluid ounce of distilled water and the troy ounce is 24.3 grains, and the difference between it and the avoirdupois ounce is 18.2 grains. It will be observed that the least difference lies nearest the avoirdupois ounce, which latter weight would then seem in better accord with the basis of a standard than the troy ounce, or 480 grains. But the writer proposes that the troy denomination be entirely ignored, and that 455.7 grains, the weight of a fluid ounce of distilled water, be substituted in place of 480 grains, as being in closer harmony with a rational system of standardizing fluid extracts; and further, that as the so-styled fluid extracts should contain the activity in perfect and permanent solution, the indefinite term "extract" be expunged, and the more comprehensive and appropriate designation "liquor," in Latin, or "liquid," in English, be adopted. This title more thoroughly expresses the nature of the preparation, especially if a fluid ounce represents the quantity of crude drug corresponding to the weight of a similar volume of distilled water. A fluid extract, as fluid extract of cinchona, for instance, would then be termed "liquor cinchonæ" or "liquid cinchona."

For an expeditious method of obtaining this weight in quantity, the avoirdupois ounce is used as above explained, only that as the difference between an avoirdupois ounce and the weight of a fluid ounce of distilled water is about one-half of one-tenth, or one-twentieth of an avoirdupois ounce, the quantity of material for a required number of fluid ounces of "liquor" will be 1-20 as many more avoirdupois ounces. This manner of weighing yields but less than 4 grains in excess of the real weight for every fluid ounce, or a trifle more than one-eighth of an ounce for every pint, and consequently inappreciable in its effect upon the standard.

In powders for percolation, but more especially for repercolation, the proper degree of fineness is a consideration of great importance. The powder should on all occasions possess a uniform fineness, and no material of any kind should be coarser than will entirely pass through a No. 50 sieve; and it may be laid down as a universal rule, that in every instance the finer the powder the more suitable it is for the purpose of repercolation. But a great difficulty arises to obtain commercial powders always sufficiently reliable for the purpose. The pharmaceutist has no practical means for reducing all material to the required state comminution, as the ordinary hand mills are completely unavailable for grinding a reasonable quantity of most any drug sufficiently fine. In such cases where the hand mill can be employed, a large surplus of the material must be repeatedly run through the mill and sifted after each grinding, until the required amount of powder has been produced. The remaining coarse powder is preserved, and subsequently ground with another lot. For the finer grades, that can by no means be produced in this manner—a circumstance much to be regretted,—the pharmaceutist must exercise his judgment and purchase the best securable quality.

Upon a proper menstruum, more than on any other requirement, depends the success in repercolation.

After conducting hundreds of repercolations, under all imaginable circumstances, the writer has arrived at the conclusion that the present menstrua for most fluid extracts, and a like observation applies to many tinctures, are too weak in alcohol. The subject of menstrua, for fluid extracts chiefly, has received a vast amount of attention, in regard to which great diversity of opinion exists, and in this particular, if any where, simplicity—as above remarked—should be strictly enforced.

Sugar, at one time,—mainly to replace expensive alcohol—was strongly suggested and largely employed in fluid extracts, but never realized the anticipations expected from its introduction, and, it is hoped, will soon be altogether excluded from these preparations.

Glycerin, as could reasonably have been foreseen, was as usual the recipient of over due attention. This is an invaluable agent in its proper place, but its universal pharmaceutical application should meet a well deserved and timely check, as the very omnipresence is an abuse of this valuable substance, and but a faint mark of true recognition. The writer has employed glycerin with gratifying success for various purposes, but has failed to recognize in it the universal solvent, the enthusiastically searched for "alkahest," at last discovered.

The presence of any substance in a medicinal combination, which can be easily excluded and is not absolutely necessary to the integrity of the compound, is a superfluous encumbrance, and should be obviated or removed. Glycerin, as a menstruum, was fairly tested at the hands of the writer, and found that, while possessing several marked disadvantages, it performed no office that alcohol could not fulfil equally as well and better. A proper menstruum for percolation must be as free from viscidity as possible, since that is a fatal objection, and much more its value increases the greater its mobility. Now glycerin renders the menstruum viscid, and the preparation complex. It is, therefore, the opinion of the writer, that in the preparation of fluid extracts, for these two reasons alone, it should be peremptorily excluded.

Alcohol, strong and dilute, and occasionally acidulated or alkaline, for special cases, furnishes all the necessary menstrua for repercolation, and by reason of the thorough satisfaction that it gives, may be justly termed the beau ideal of repercolating menstrua.

In the production of fluid extracts, the only desirable portion of the crude material are the active principles in which alone the medicinal power resides, and which is usually but a trace quantitatively compared with the aggregate material. Therefore, in an attempt to prepare a liquid representative of any drug, the aim should be directed to a complete exhaustion of the activity, with the exclusion of the greatest possible amount of inert matter.

For therapeutical and other reasons, a menstruum should always be as weak in alcohol as the exigencies of the case will permit, but under no pretext should it be so weak as to compromise the medicinal strength or permanence of the preparation in the slightest degree. In some substances, owing to peculiar envelopment or native combinations of the active principles, an alcoholic menstruum, of whatever strength, fails to exercise a solvent power of the required extent. On such occasions, according to the nature of the active ingredient, an acidulated or alkaline menstruum always yields the desired result.

When a substance contains no viscid constituent, but a readily soluble active principle, weak alcohol can always be successfully employed.

When the activity resides in a resinous body, or a fixed or volatile oil, a strongly alcoholic menstruum must invariably be used.

When a substance is charged with viscid and extractive matter, and as is usually the case, contains principles easier soluble in weak than in strong alcohol, the strength of the menstruum must be so regulated that whilst complete exhaustion of the activity is secured, the viscidity must be so effectually excluded as not to occasion irregularity in the percolating current.

When a substance consists largely of gum or extractive, so as to become thick and ropy with water or weak alcohol, and totally impervious to strong alcohol, as for instance, scilla. Or when even strong alcohol produces a viscid solution, but difficultly exhausts the activity, as with calumba. Or, when the strongest alcohol alone exhausts the virtue and yet forms a very viscid solution, as with lupulina. Then the substance is not susceptible of repercolation.

It becomes necessary here to state that the majority of pharmaceutists are utterly regardless as to the strength of alcohol, in making their preparations. The difference between alcohol and alcohol fortior, more properly alcohol fortius, is not generally appreciated, and therefore, every grade of menstruum so used, excepting alcohol fortius, is at least ⅛ above the officinal standard. As no difference is usually made between the two terms, alcohol and alcohol fortius, and the latter strength is indescriminately used, then, of course, diluted alcohol is erroneously supposed to be produced by mixing equal measures of water and alcohol fortius. Now it must be understood that practically alcohol fortius is the 98 per cent. alcohol, so called, which, however, is not usually above 95 per cent. by volume. But as officinal alcohol contains only 85 per cent. of absolute alcohol, it is practically only ⅞ as strong as the former. Therefore, when alcohol fortius is officinally prescribed, take the strong alcohol of the shops. But when simply alcohol is demanded, invariably use a mixture of 7 measures of strong alcohol and one of water.

For diluted alcohol 56 measures of strong alcohol and 72 of water, must be mixed. That is, to make one gallon of diluted alcohol, take 3½ pints of strong alcohol and the rest water. To make a gallon mixture of 3 parts of officinal alcohol and one of water, take 5¼ pints of strong alcohol and the remainder water. In making mixtures of any other proportions, remember that officinal alcohol is practically only ⅞ as strong as alcohol fortius, or the so called, 98 per cent., and that in practice no allowance need be made for contraction.

The complications of the original percolator, or as it was called, Count Reals' press, are now found to be not only superfluous and unnecessary, but really inapplicable for the method of repercolation.

Hydrostatic pressure in percolation is now generally abolished, as no gain results over the simpler and more effective process with a comparatively low stratum of liquid, impelled by the force of gravity alone.

A subsequent form of percolator, called the conical, is merely an ordinary funnel, which for a single percolation, with a proportionately large volume of menstruum in small operations, answers its purpose well, and the only argument advanced in its favor, has been, that it permits the material to swell, and thus facilitates the permeation of the liquid. But no menstruum should be so aqueous as to cause a distention of the medium, and therefore the advantage is only apparent, as in most cases where the material swells up a very coarse powder, and consequently, much menstruum must be used, otherwise the uniformity of the percolation is checked, and independent channels are formed, through which the liquid escapes, leaving a large extent of material untouched.

A proper percolator for all operations, and particularly repercolation, must invariably be cylindrical, and should, by all means, be made of glass, having an abrupt termination, forming a shoulder, as a firm support for a numerously perforated earthen-ware diaphragm. The diameter of the apparatus being the same throughout the whole extent, the height of the column, for different materials, should on no occasion be lower than ¾, and never exceed twice the diameter. In other words, a percolator six inches in diameter, must not be over 18 in altitude, in which the column of any substance whatever must not reach over 12 inches, and will then conveniently accommodate 48 troy ounces of a powder, having a medium density. In the absence of proper percolators, the writer on one occasion temporarily employed, with much satisfaction, the ordinary tin cans in which pharmaceutists usually receive powdered drugs. The altitude of these vessels is equal to their diameter, so that the column of substance ought not to reach beyond three-fourths the height. The apparatus is constructed by making numerous perforations in the bottom, and supporting the whole on an ordinary funnel. It is convenient with glass percolators to have the height and diameter etched or scratched into the glass; also to have them graduated in diameters, half or fourth diameters, but best in inches.

During the process, the percolator properly should not hang, but be supported on a longitudinal shelf or platform; supplied with an ample number of circular openings for various sized percolators, so that their narrow ends can reach sufficiently far below to be adapted to appropriate receptacles for the percolate. The upper end of the percolator must then be closed with loosely fitting earthen-ware or tin covers.

The powdered material, before its introduction into the apparatus, must always receive a preliminary moistening with a portion of the menstruum, in order to insure a perfectly even adjustment of the packing, and a sufficient affinity for the menstruum to admit of a uniform penetration,

But officinally and otherwise, the powders are generally moistened too much, from which arises the inability of the operator to effect a proper adjustment, and thus becomes the serious cause of the irregular compactness so detrimental to the process. The menstruum, as above advised, must never produce a gummy and adhesive mass, but, instead, an even, loose and easily manipulated powder. The proportion of liquid for moistening should not be less than one fluid ounce to 16 troy ounces, and under no circumstances, exceed 4 fluid ounces. To insure a proper mixture, a peculiar management is indispensable. If the powder has been on hand, and contains compact portions, it must first be sifted. Then ¼ of it is placed into a suitable vessel, which is best a one gallon enameled cast-iron dish, and about the proper capacity for 16 troy ounces of powder, more than which can not be conveniently manipulated at one time, and the whole of the moistening liquid for the 16 Troy ounces poured on to the center of it; by means of a stoneware pestle, (never with the hands directly), the powder and liquid are stirred together with a rotatory motion, commencing in the middle and gradually bringing in the dry powder from the margin; another fourth is then added and incorporated; finally, the remaining half is introduced and uniformly mixed,

In any percolation, the whole quantity of drug is divided into three separate parts, in the proportion of 18, 16 and 14, one for each percolation. The largest portion is first used, as it is found that the fresh menstruum in the first percolation, by reason of its greatest fluidity and solvent power, can therefore, be employed in the smallest proportion, and thus give greater scope for the menstruum in the subsequent percolations.

If by chance, which, however, with correct management is almost completely precluded, obstructions should form and channels be produced throughout the mass, the percolation must be continued until, (which can be readily ascertained with glass percolators,) practical exhaustion has resulted. Then the material in the subsequent percolations must be increased in proportion to the liquid obtained, or if this occurred in the 3d percolation, a fourth one must be performed. The writer on several occasions, through the use of an improper menstruum, was compelled to resort to even a fifth percolation. But in such cases, that is after the 3d percolation, the first and more concentrated portion of the percolate is then reserved, and only the weaker percolates employed, otherwise in a regular and successful process no first percolate is exclusively reserved, but the whole quantity of liquid, although divided, is successively percolated through each division of the material. The same quality of menstruum must always be used to the end, and the percolation continued beyond the prescribed limit for the preparation. The weak percolate is retained for another occasion.

The best recipients for the percolates are the ordinary wide-mouthed packing bottles, holding one, two, four, six and eight pints, respectively. These must be graduated, the largest in pints only, and the two smallest in fluid ounces; one or two sets of such receptacles, if not altogether indispensable, are at least exceedingly convenient, and can be most readily and accurately graduated as follows: Two bottles of the same capacity are balanced on the pans of an ordinary tolerably accurate druggists scale; 7291 grains, or one pound and 291 grains avoirdupois, the weight of a pint of distilled water at the ordinary temperature, is placed on one of the pans, and the equilibrium restored by pouring water into the bottle on the opposite pan. The edge of the water level is then marked with a file, and the etch produced will accurately indicate the measure of a pint. The bottle with the water is now replaced, the weights removed, and the equilibrium again restored by pouring water into the empty bottle. This bottle is now marked like the preceding, returned to the scale, the weights replaced, and counterbalanced by another addition of water to the first bottle; this is again marked for the second pint. By alternately removing the weights and adding water, the bottles are graduated to their utmost capacity. The smaller bottles are graduated in a similar manner; 456 grains, the weight of a fluid ounce of water, is then the weight employed.

With all the necessary implements at hand, the process of repercolation may be described as follows:

To make 3 pints of any fluid extract, take, according to the nature of the material, a percolator with either a broad or narrow diameter; at all events such that the height of the column of substance even in case of the least viscidity in conjunction with the strongest alcoholic menstruum, may not exceed twice the diameter. Insert the perforated diaphragm, and exactly cover it with a disc of common filtering paper. Then weigh off 18 troy ounces of the powder, and moisten it as above explained. Introduce a portion of this into the percolator to the extent of several inches, and by means of a wooden pestle-shaped stick, about 24 inches in length, with the two bases perfectly round level, and about 1½ to 2 inches in diameter, uniformly press (never strike) the powder, commencing in the middle and in a circular route extend the pressure gradually to the outer edge. The pressure for several of the lower strata, must be but moderately firm, but unfailingly so compact that the powder will not very visibly contract, unless an extraordinary force is exerted; another layer is now introduced and similarly treated, gradually pressing more firmly toward the top; finally cover the column with a diaphragm like the lower one, fix the percolator in its place and pour on the menstruum, then covering the percolator securely. The liquid now gradually descends evenly through the column, but the descent should not be more rapid, in most cases, than an average of one-half an inch per hour. When two pints of percolate has passed, (which, for this quantity of dry material, must flow no faster than at the rate of 2 fluid ounces per hour; otherwise, a cork must be inserted into the lower orifice of the percolator, to give the stream the required velocity, and which in larger operations must always be more rapid in proportion to the quantity of material,) remove and preserve it in an ordinary bottle; of the remaining percolate, collect 10 fluid ounces and 6 fluid ounces, each separately, and the rest, or exhaust percolate in one quantity.

Now weigh off 16 Troy ounces more of the substance, moisten it as above, with a proper quantity of the first percolate and proceed again exactly as in the first percolation, only adding each separate percolate when the preceding one has disappeared beneath the surface, following after these with the clear menstruum used in the first percolation, until the required quantity of percolate has always been again obtained. For the 3d percolation, take 14 troy ounces of the material, and with this complete the process, observing that the percolates be collected separately, in case another percolation must be resumed. During the process, and especially where more than one is conducted, the percolators and receptacles, should invariably be distinctly marked by pasting on slips of paper bearing the necessary data. Also, the surface of the column during percolation, should never be permitted to remain uncovered with liquid any great length of time, so that contraction takes place and crevices are formed, as that would most seriously interfere with the result. If the advanced stage of any percolation permits, the next one in order may be commenced before waiting for the completion of the anterior one, but only when there is positively no danger that there will be lack of menstruum for its uninterrupted continuance.

In the writer's experience, the following observations were made in regard to menstrua, and the necessary state of comminution and humidity of the substances named.

Barosma should be in the finest possible powder; the proper menstruum is officinal alcohol, and of the powder before packing, 16 troy ounces, should be moistened with two fluid ounces of the menstruum.

Cimicifuga should be in the finest attainable powder. The best possible menstruum is 3 parts of officinal alcohol and one of water; 16 troy ounces require two fluid ounces.

Cinchona should be in full strength and in very fine powder. And no better menstruum for this is known than the mixture of 3 parts officinal alcohol and one of water, to every pint of which 2 fluid ounces of strong chlorhydric acid has been added. This menstruum exhausts with facility, forming a dark, red percolate. The peculiar advantage is that all the alkaloids are dissolved as very soluble chlorides, whilst the acid of the native quinia sulphate forms calcium sulphate, (which precipitates in the bark) with the calcium chloride first produced by the action of the chlorhydric acid on the native calcium kinate. Thus forming a solution of all the alkaloids with all the kinic acid free, together, with the generated calcium chloride. The cinchotannic and kinovic acid is also assumed to be free. 16 troy ounces are moistened with 2 fluid ounces of menstruum.

Conium should be at least in 50 powder, finer grades of course are better. The officinal menstruum answers well, but perhaps, it would be best in all cases of acidulation, for the sake of stability, to exclude organic acids and substitute the best adaptable of all acids, the chlorhydric. 16 troy ounces can be moistened with 2 or 2½ fluid ounces of the menstruum.

Secale should be in 50 powder. The officinal menstruum is good. 16 troy ounces can be moistened with 1½ fluid ounces.

Gentiana must be in 50 or 60 powder. No weaker alcoholic menstruum than 3 parts of strong alcohol and one of water will do. 16 troy ounces can be moistened with one fluid ounce.

Hyoscyamus is best in the finest attainable powder. The most suitable menstruum is 3 parts of officinal alcohol and one of water. 16 troy ounces can be moistened with 2 fluid ounces.

Ipecacuanha is best in very fine powder. The best known menstruum is the mixture of 3 parts of officinal alcohol and one of water. 16 troy ounces can be moistened with 2 or 2½ fluid ounces.

Lupulina; although not producible by repercolation, the fluid extract must be prepared by the officinal process, but, 16 troy ounces of it should first be moistened with one fluid ounce of menstruum before packing.

Prunus. The fluid extract should be twice as strong as the officinal. The powder should be 50 or 60, and the menstruum 3 parts of officinal alcohol and one of water; after the percolation, the product only contains the bitter principle amygdalin. Then to every fluid ounce of it, 16 minims of diluted cyanhydric acid and one minim of oil of bitter almond must be added, but best not until it is used.

Rheum. The powder should be no coarser than 50 or 60, but the much finer grades are better. Officinal alcohol is the best menstruum, and 16 troy ounces must be moistened with one fluid ounce.

Sarsaparilla should be at least in 60 powder, but a finer one is better. The best menstruum is a mixture of equal measures of strong alcohol and water; 16 troy ounces may be moistened with three fluid ounces.

Senna can be used in No. 50 powder, although finer powders are better. The proper menstruum is a mixture of equal measures of strong alcohol and water; 16 troy ounces must be moistened with 2½ fluid ounces.

Taraxacum. The powder should never be coarser than No. 50; a much finer powder is greatly to be preferred. A good menstruum—and no weaker one can be utilized—is the mixture of three measures of officinal alcohol and one of water. But the best is undoubtedly the mixture of three measures of strong alcohol and one of water; 16 troy ounces can be moistened with 2 fluid ounces.

Valeriana should be in the finest attainable state. The very best menstruum is the mixture of three measures of officinal alcohol and one of water; 16 troy ounces can be moistened with 1½ fluid ounces.

Veratrum Viride should be at least in 60 powder, but if procurable a much finer grade should be provided. The best possible menstruum is officinal alcohol; 16 troy ounces can be moistened with two fluid ounces.

Zingiber should be the African, and in the ordinary commercial powder. The best menstruum is officinal alcohol; 16 troy ounces can be moistened with one fluid ounce.

From an extensive list of unofficinal fluid extracts prepared by the writer, the following can only be noticed here:

Gossypium. The bark of the root should be in the very finest powder. The only practicable menstruum is the mixture of three measures of officinal alcohol and one of water; 16 troy ounces can be moistened with two fluid ounces.

Cubebs. The commercial powder can be employed. The proper menstruum is officinal alcohol; 16 troy ounces can be moistened with one fluid ounce.

Gelsemium. The bark of the root, must be in the finest powder. The best menstruum is the mixture of three measures of strong alcohol and one of water; 16 troy ounces can be moistened with two fluid ounces.

Hydrastis should be in fine powder. The menstruum is the mixture of three measures of officinal alcohol and one of water; 16 troy ounces can be moistened with two fluid ounces.

Matico should be in very fine powder. The menstruum is officinal alcohol; 16 troy ounces can be moistened with one fluid ounce.

Pareira should be in the finest possible state. The best menstruum is the mixture of equal measures of strong alcohol and water; 16 troy ounces can be moistened with two fluid ounces.

Podophyllum should be in very fine powder. The menstruum is officinal alcohol; 16 troy ounces can be moistened with 1½ fluid ounces.

Senega must be in fine powder. The very best menstruum is officinal alcohol; 16 troy ounces can be moistened with 1½ fluid. ounces.

Stillingia must be in fine powder. The best menstruum is the mixture of three measures of strong alcohol and one of water; 16 troy ounces can be moistened with two fluid ounces.

Scutellaria must be in the very finest powder. The best available menstruum is the mixture of three measures of officinal alcohol and one of water. No weaker menstruum is at all admissable. 16 troy ounces can be moistened with 2½ fluid ounces.

Corydalis can be in No. 50 powder. The best menstruum is the mixture of equal measures of strong alcohol and water; 16 troy ounces can be moistened with 1½ fluid ounces.

Aurantium can be in No. 50 powder. The best menstruum is the mixture of three parts of strong alcohol and one of water; 16 troy ounces can be moistened with one fluid ounce of the menstruum.

# FORMULARY OF ELIXIRS AND PREPARATIONS OF THE NEWARK PHARMACEUTICAL ASSOCIATION.

ADOPTED MAY 7, 1871.

*Forwarded to The Pharmacist by* C. B. SMITH, *Newark.*

*Wine of Beef and Iron.*—

| | |
|---|---|
| ℞ Extracti Carnis (Liebig's) | 1 oz. |
| Ferri Citrat | 96 grs. |
| Vini Xerici | 16 oz. |
| Syrupi | 2 oz. |
| Pimentæ (contus) | ½ dr. |
| Aquæ | q. s. ft. 24 oz. |

Dissolve the Extract Beef in 4 oz. of water and add the Allspice—after standing 10 hours add the Wine and Syrup, then the Citrate of Iron, previously dissolved in 2 oz water—filter.

Each fluid ounce contains: Fresh Beef, 1 oz.; Citrate Iron, 4 grains. Dose—one tablespoonful.

*Nutritive Wine. Liebig's Extract of Beef and Wine.*—

Prepared same as above, omitting the Citrate of Iron.

*Elixir Calisaya.*—

| | |
|---|---|
| ℞ Cort. Cinchonæ flav | ½ oz. |
| " " (Calisaya) | ½ oz. |
| " Auranti | ½ oz. |
| Sem. Coriand | 2 dr. |
| Cocci Cacti | 1 dr. |
| Spts. Vini. Deod$^{d}$ | 12 oz. |
| Aquæ | 10 oz. |
| Glycerinæ | 5 oz. |
| Syrupi | 5 oz. |

Reduce the Barks, &c., to a moderately fine powder, and pack firmly in a percolator; mix the deodorized Spts. water, Glycerine and Syrup, adding enough water to make two pints of percolate, to which add 20 grains powdered Tartaric Acid, and after standing 24 hours, filter.

Each fluid ounce contains: 16 grains Cinchona Bark.

*Elixir Pyrophos Iron and Quinine.*—

| | |
|---|---|
| ℞ Ferri Pyrophos | 160 grs. |
| Quiniæ Sulph | 10 grs. |
| Spts. Vini Deod | 2½ oz. |
| Syrupi | 3 oz. |
| Aquæ | 9½ oz. |
| " Flor Auranti | 5 oz. |
| Acid Sulph. dil | q. s. |

Dissolve the Pyrophosphate Iron in the water and add the Syrup; then dissolve the Quinine in the Orange Flower water, with as little diluted Sulph. Acid as possible, and gradually mix them. Filter.

Each fluid ounce contains: Pyrophos. Iron, 8 grains; Sulph. Quinine, ½ grain.

*Elixir Quinine, Iron and Bismuth.*—

| | |
|---|---|
| ℞ Elixir Ferri Pyrophos. et Quiniæ | 16 oz. |
| Bismuth, Citra Ammon | 128 grs. |

Dissolve.

Each fluid ounce contains: 8 grains Pyrophos. Iron; 8 grains Citrate Bismuth; ½ grain Quinine.

*Elixir Pyrophos Iron, Quinine and Strychnine.*—

| | |
|---|---|
| ℞ Elixir Ferri Pyrophos. et Quiniæ | 16 oz. |
| Strychniæ | 1 gr. |

Dissolve.

Each fluid ounce contains: Pyrophos Iron, 8 grains; Quinine, ½ grain; Strychnia, 1-16th grain.

*Wine of Pepsin.*—

| | |
|---|---|
| ℞ Pepsin (Hawley's) | 160 grs. |
| Vini: Xerici | 16 oz. |
| Acid Mur: Dil | 1 dr. |

Triturate the Pepsin with 4 ozs. of Wine mixed with acid. Pour this upon a filter, and pass the balance of the Wine through it.

Each fluid ounce contains: Hawley's Pepsin, 10 grs.

*Elix. Aromatic.*—

| | |
|---|---|
| ℞ Cort. Auranti | 4 drs. |
| Sem. Coriand | 2 drs. |
| " Angelicæ | 2½ drs. |
| Cocci Cacti | 1 dr. |
| Spts. Vini Deod | 12 oz. |
| Aquæ | 10 oz. |
| Glycerinæ | 5 oz. |
| Syrupi | 5 oz. |

Percolate 2 pints.

A pleasant vehicle for administering nauseous remedies.

*Elix. Val-Ammonia.*—

| | |
|---|---|
| ℞ Ammoniæ Valerianat | 96 grs. |
| Fl. Ext. Vanil | |
| Tr. Cardam. Comp. a a | ½ oz. |
| " Xanthoxyl | 2 drs. |
| Syr. Auranti. Cort | 6 drs. |
| Aquæ | 4 oz. |

Dissolve the Valerianate of Ammonia in the water, and add the other ingredients, previously mixed.

Two grains Val-Ammon to each drachm.

*Comp. Syrup of Hypophosphites and Iron.*—

| | |
|---|---|
| ℞ Hypophos Sodæ, | |
| " Calcis, | |
| " Potassæ a a | 256 grs. |
| " Ferri | 126 grs. |
| Aquæ | 12 oz. |
| Sacch Alb | 18 oz. |

Dissolve the Hypophosites in the water in a water bath, and filter. Add sufficient water to make up for the evaporation. Add sugar—and apply gentle heat to make syrup—21 oz.

Each fluid ounce contains: Hypophosphite, Soda, Lime and Potass. 12 grains each; Hypophos. Iron, 6 grains.

*Comp. Syrup of Hypophosphites.*—

Same as above, omitting the Iron.

*Chemical Food.*—

℞ Parrish's Formula, omitting Cochineal and Muriatic Acid. See U. S. D.

Each teaspoonful contains 1 grain Phophate of Iron, 2½ grains of Lime and the other Alkaline Phosphates.

*Elixir Pepsin, Bismuth and Strychnine.*—

| | |
|---|---|
| ℞ Pepsin (Hawley's) | 256 grs. |
| Bismuth Citrat | 64 grs. |
| Strychniæ | 1 gr. |
| Aq. Flor. Auranti | 6 oz. |
| Spirit Vini Deod | 2 oz. |
| Aquæ | 4 oz. |
| Glycerine (pure) | 2 oz. |
| Syrupi | 2 oz. |

Triturate the Pepsin with the water and Glycerine, an filter; dissolve the Bismuth in 2 oz. orange flower water, with a few drops of Aqua Ammonia; dissolve the Strychnine with a few drops of Acetic Acid. Add the Bismuth solution to the Pepsin, then the balance of the fluids, and finally the solution of Strychnia.

Each fluid ounce contains: Pepsin, 16 grains; Citrate Bismuth, 4 grains; Strychnine, 1-16th grain.

*Ferro-Phos. Elixir Gentian.*—

| | |
|---|---|
| ℞ Cort. Auranti | 1 oz. |
| Sem Coriand | 1 dr. |
| Macis | 1 dr. |
| Rad. Gentian | 1 oz. |
| Spts. Vini Deod | 4 oz. |
| Aquæ | 4 oz. |
| " Flor Auranti | 2 oz. |
| Syrupi | 6 oz. |
| Ferri. Pyrophos | 256 grs. |

Reduce the roots, seeds, &c., to a moderately fine powder, pack in a percolator—mix the Spirits and Waters, and percolate 10 ounces. Dissolve the Pyrophosphate of Iron, add the syrup and filter.

Each fluid ounce represents: 16 grains Pyro-phos. of Iron; 30 grains Gentian.

# GLYCERIN; ITS QUALITY AS IT EXISTS IN COMMERCE.

BY JOSEPH P. REMINGTON, PHILADELPHIA, PA.

This powerful solvent and useful medicine, though but lately called from its seclusion in the cabinet in answer to the demands of this progressive age, has rapidly ingratiated itself into the esteem of the chemist, pharmacist, and the public at large.

It continues to widen its sphere of usefulness; we hear of new applications constantly; and its *bland manners* and *insinuating disposition* have won for it a host of friends, and an ever-increasing popularity.

It serves its mission as faithfully on the dressing-table of a lady as it does in our gas meters; as well as an excipient for pill masses as it does a substitute for molasses in printers' rollers, and its range of applications between these extremes is varied and extensive.

Its production, with a view to improve the quality and lower the price, has been attended with success, as we all know. A glycerin which will answer almost every purpose, (except for internal administration,) can be procured for twenty-five cents per pound; and one fit for any purpose for sixty cents per pound.

One of the principal reasons for bringing this matter before you, is to detail a comparative examination of the different brands in the market, which examination was at first undertaken for the writer's own satisfaction, but which may prove not uninteresting to the Association. Each glycerin was tested by the same reagent, in the same relative quantity, at the same time; and the effect carefully noted.

The glycerins, as they stood in their commercial attire before the

| BRANDS. | For Strength. Sp. Gr. | Color. | Odor when warm. | Nitrate of Silver. |
|---|---|---|---|---|
| Bower's Pure.............. | 1.253 | None. | None. | No precipitate. |
| Gordon's Pure............. | 1.240 | Yellowish. | Fatty. | He'vy white prec. |
| Concentrated.............. | 1.250 | Yellowish. | Slight. | Rose color. |
| Sarg's Chemically Pure..... | 1.254 | None. | Empyreumatic. | No precipitate. |
| Sarg's second quality....... | 1.250 | Quite dark. | Like glue. | White precipitate |
| De Haen's Chemically Pure. | 1.245 | None. | Slight. | Rose color. |

| BRANDS. | Sulphuric Acid. | For Sulphate of Lime. | For Lime Salts Ox. Ammon. | Ferro-cyanide of Iron |
|---|---|---|---|---|
| Bower's Pure.............. | Slightly discolored | No precipitate. | No precipitate. | Opalescence. |
| Gordon's Pure............. | Discolored. | No precipitate. | Slig't precipitate | Clear. |
| Concentrated.............. | Discolored. | No precipitate. | No precipitate. | Opalescence. |
| Sarg's Chemically Pure..... | Discolored. | No precipitate. | No precipitate. | Precipitate. |
| Sarg's second quality....... | Slightly discolored | No precipitate. | White precipit'e | Slight precipitate. |
| De Haen's Chemically Pure. | Discolored. | No precipitate. | No precipitate. | No precipitate. |

| BRANDS. | Hydro-sulph. of Ammon.; | Chloride of Barium. | For Ethyl-Butyrate | For Sugar. |
|---|---|---|---|---|
| Bower's Pure.............. | No precipitate. | No precipitate. | Slight odor. | Free from sugar. |
| Gordon's Pure............. | No precipitate. | Slight precipitate. | Strong odor. | Free from sugar. |
| Concentrated.............. | No precipitate. | Precipitate. | Slight odor. | Free from sugar. |
| Sarg's Chemically Pure..... | No precipitate. | No precipitate. | Very slight odor | Free from sugar. |
| Sarg's second quality....... | No precipitate. | Opalescent. | Slight odor. | Free from sugar. |
| De Haen's Chemically Pure. | Slight precipitate. | No precipitate. | Slight odor. | Free from sugar. |

examination, presented quite a contrast; the most pretentious was one of the latest comers into the market, De Haen's; which, from the size of the bottle, would lead to the supposition that it contained more than a pound. This glycerin has attracted attention by reason of the free use of adjectives on the label, and on account of a vigorous attack on the propriety of using adjectives by the editor of a trade journal.

Sarg's Pure Glycerin is put up in a very attractive style, the blue stencilled label and the refractive property of the glycerin contrast to very good advantage.

The American glycerins were in a plainer and neater dress, Bower's, Gordon's and Concentrated, being put up in the usual glycerin bottle with a plain label.

The result will be found in the foregoing table.—*Proc. Amer. Pharm. Assoc.*, 1870.

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## ON GLYCYRRHIZIN.

BY JOSEPH M. HIRSH, OF CHICAGO.

"What is the easiest and most practicable method of isolating glycyrrhizin; to what extent does it possess the power of masking bitterness; and what is its mode of action?"

The mode of preparing glycyrrhizin, mentioned in the last Dispensatory, of precipitating the same from a cold infusion, I found highly impractical, on account of the slight solubility of the same in cold water. Berzelius's method of preparing it from sulphate of glycyrrhizin gave but a dark-colored product, difficult to purify, while Vogel's method of preparing a plumbate of glycyrrhizin, and subsequent decomposition with hydric sulphuret, is rather laborious. The best practical process appeared to be the preparation from an infusion made with *boiling* water of acetate of glycyrrhizin, which upon evaporation to dryness is dissolved in alcohol, when the acetic acid is neutralized with soda, the new salt crystallizing out, while the glycyrrhizin remains in solution. Another method, giving good results, I found to be the preparation of an alcoholic extract by percolation, which I heated to the boiling-point, filtered off from the deposit produced, when I evaporated nearly to dryness, redissolved in alcohol, from which solution it remained behind almost pure upon evaporation.

Experimenting with this product in regard to its relation to masking bitterness, I found one part to cover up the bitter taste of four parts of Epsom salts, a slight addition of the latter being plainly perceptible, although by no means as disagreeable as when tasted alone. Of an alcoholic extract of coffee, an amount representing twenty parts of coffee, lost its bitter taste upon the addition of the glycyrrhizin. A number of other experiments of similar kind were made, but your reporter respectfully expresses his doubts about the *mathematical* reliability of results, arrived at by taste alone, and confines, therefore, his remarks to the *modus operandi* of the glycyrrhizin.

Taste being an effect upon the nerves of sensation (of taste), the change of taste can be produced either by a chemical change of a substance, or by a peculiar local affection of the nerves of taste. The first case, as might have been anticipated, with Epsom salts, does not occur, the glycyrrhizin not affecting the sulphate of magnesia in any way.

The second supposition then lay near, namely, that the nerves were rendered insensible to the bitter taste. This might be done by an organic change of nerve-matter, or by the interposition of a foreign body between the nerves and the bitter substance. To ascertain the former lay beyond the facility of your reporter, and I made, therefore, the best of the last supposition, which seems to give a true solution of the problem. When glycyrrhizin or liquorice dissolves upon the tongue, the latter soon becomes furred, coated, this coat being a coagulum of the albumen of the saliva with the glycyrrhizin. A few tests convinced me that even a weak solution of albumen coagulates readily with glycyrrhizin, and I took the artificial coating of the nerves produced by the albuminous coagulum of glycyrrhizin to be the true cause of its masking bitterness. If this was true, other substances, which readily coagulate albumen, should produce the same result.

With this idea I tried a solution of carbolic acid with various bitter substances, and in each case the bitterness was annihilated if the quantity of carbolic solution was sufficient. But while glycyrrhizin and its compounds are sweet, this is not the case with carbolic acid, the taste of which replaced that of the bitter substance with which it was mixed, this taste being in itself not agreeable. To remedy this evil carbolate of glycerine was tried with success. Epsom salts, coffee, absinthe, &c., lost their bitter taste when mixed with a sufficiency of carbolic glycerine.—*Proc. American Pharmaceutical Asstn.*, 1870.

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CONEIN.—Prof. J. Lawrence Smith kindly sends the following very interesting item translated from the *Bericht. Deut. Chem. Gesell.*, December, 1870:

"*The first artificial production of a Vegetable Alkaloid* (*Conein*) *by Hugo Schiff.* This alkaloid has been heretofore only known as the product of the plant. Schiff has produced it artificially. For some months he has been engaged in examining the reaction of ammonia and the aminbases on aldehyde, and one of the products then discovered was *butyric aldehyde.* Latterly he has been examining the reaction of an alcoholic solution of ammonia in this butyric aldehyde at a temperature of 212° Fahr., and from this he obtained two bases, which he calls Tetrabutyraldin and Dibutyraldin. By heating this last until it distills, the first product is a neutral oily substance; and the substance which comes over last is a strong alkaline base that proved to be conein, having the poisonous and other physiological properties of the neutral conein. The amount produced is yet small and costly; but the history of chemistry shows that the demand for its products is the greatest stimulant to increased production and cheapening cost. In this is to be seen a decided step toward the artificial production of morphine, quinine, etc."—*American Practitioner.*

# ON THE USE OF LIQUID CAOUTCHOUC AS AN ADDITION TO EMP. BELLADONNÆ AND OTHER PLASTERS.

By J. Willitts Worthington.

The author has treated this subject at some length in his Inaugural Essay before the Philada. College of Pharmacy, from which we abstract the following:

Much difficulty has been experienced by pharmaceutists in preparing belladonna plaster so as to retain its adhesiveness when kept ready spread for some time. The proposed improvement consists in the addition of india rubber used in the form of a solution, made as follows:

| | |
|---|---|
| Take of pure Caoutchouc, cut in small pieces, | an ounce. |
| Benzine (from Petroleum), | a pint. |

Macerate with occasional agitation in a suitable stopped, wide-mouthed bottle until a thick, saturated solution is obtained. To prove its efficacy in preserving the pliability of plasters, the author prepared a mixture of 3 ounces of Burgundy pitch, 4 drams of yellow wax, 2 drams of rosin and 2 drams of lard. Melted and strained. This, when spread and kept two months, became very brittle and cracked on handling.

The same ingredients, with the addition of 4 drams of liquid caoutchouc incorporated when they were in a fused state, possessed the following characters:

Very little tendency to crack, retains its pliability, is more adhesive, and has a beautiful, smooth, glossy appearance. After two months, part of it very cold weather, this plaster retained its pliability.

Experiments were then made with officinal belladonna plaster, which resulted in the following proportion being considered most suitable:

| | |
|---|---|
| Take of Belladonna plaster (U. S. P.), | seven drams. |
| Liquid Gum Elastic, | one dram. |

The belladonna plaster to be melted by a water-bath, and the liquid rubber then added and stirred well until united thoroughly.

The odor of the benzine disappears when the solution is added in this way. It is quite important to avoid an excess of heat, and hence the water-bath is recommended.

Liquid rubber will be found to act admirably in all plasters which may be made to keep through the summer.—*Am. Journ. Pharm.*

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# TEST FOR BLOOD STAINS.

W. J. Gunning has discovered that acetate of zinc will completely precipitate the coloring matter of blood from solutions. The flocculent precipitate must be washed by decantation, left to evaporate and dry on a watch glass, and if blood was present the microscope will reveal delicate and beautiful hæmin crystals. The test has been tried by different persons and always with entire success. The blood stains can be dissolved in a variety of agents, for example, ether, oxalic acid, alcohol, gallic acid and potash, and the acetate of zinc produces precipitates even in extremely dilute solutions, as for example, when a person has washed his bloody hands in a pail of water, and the solution is perfectly colorless.—*Journal of Applied Chemistry*

## SYRUPUS CROCI.

To the Editor of the AMERICAN JOURNAL OF PHARMACY:

DEAR SIR,—For some time past I have been called upon to make considerable quantities of syrup of saffron, and not knowing of a reliable formula, the one I herewith send you for publication presented itself, and am happy to state produced the finest preparation of the kind I ever saw. As commonly prepared, it is apt to ferment, and of course is worthless; during the summer months I have found it to ferment with ease. This is entirely obviated by substituting glycerin for sugar, according to the formula I send you. I have some in my store which I made eight months ago and it is as perfect as when first made. In making this syrup I use part glycerin instead of sugar. We all know that the medical properties of saffron are due to the volatile oil, and in order to obtain this we must guard against heat in the preparation of the syrup, and make it cold, as when heat is used it drives off part of the volatile oil. The next point is to use something that will dissolve the vol. oil from the saffron, and for that purpose I have used glycerin, and find it to work admirably.

| | |
|---|---|
| Take of true Saffron, . . | ℥ ss. |
| Glycerin, . . | ℥ ij. |
| Water, . . | ℥ vi. |

Let the above macerate for seven days, filter into a pint bottle and add water through the filter q. s. to make ℥ viii, then add sugar 14 oz. av. and dissolve cold by frequent agitation. The result is a beautiful thick, dark orange-colored syrup.

I present this to the readers of the Journal. In case they are in want of a formula, they will find this a reliable one.

Yours respectfully, GEO. W. KENNEDY.

*Pottsville, Pa., Jan. 9th,* 1871.

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## IMPROVED DOVER'S POWDER.

### BY B. D. KEATOR, M. D.

A very convenient and useful compound is Dover's Powder; but, unfortunately, a very *nauseous* one. I have for several years past had it under consideration, making various changes in its composition; but until recently with poor success. The diaphoretic powder of Dr. Tully, and also that lately recommended by Dr. Brinsmade, I have found, on trial, to be good *anodynes*, but far inferior in *diaphoretic* effect to the old Dover. The ipecacuanha cannot be dispensed with, but I think the opium and sulphate potassæ (the main nauseants) *can* be replaced with better ingredients. Ipecac, in doses under half a grain is anti-emetic, and "not guilty" in the nauseous taste of Dover.

Out of Dover's, Tully's and Brinsmade's powders I have compounded a *fourth*, which I believe contains the excellencies of *all*. There is one grain of ipecacuanha, and one-sixth gr. sulph. morphia (equal to 1 gr. opium), to every 10 gr. of. the mixture. The camphor adds much to it as an anodyne; the chalk is anti-acid, and necessary to hold the camphor in pulverized form, and the liquorice, besides disguising the taste of the rest, is of itself useful as a demulcent, expectorant, etc. I can confidently recommend this to my brethren of the profession who choose to give it a trial, as *superior to the old Dover's powder in every respect.*

| | | |
|---|---|---|
| R | Sulph. Morphia | grs. x. |
| | Pulv. camph | ʒ iii |
| | " Ipecacuan | ʒ i |
| | Creta Preparat | ʒ iii |
| | Pul. Glycyrrh | ʒ iii |

Thoroughly mix. Dose same as Dover (in water).
—*Tolono, Ill., Medical Gazette.*

## EDITORIAL.

We publish elsewhere the announcement of The Chicago College of Pharmacy for the lecture season of 1871–2. The prospect is very encouraging for a large class during the coming session, and constant accessions to it in the future. At this day it seems almost useless to dwell upon the importance of an extended apprenticeship and thorough schooling for those who are to assume the responsible duties of the pharmacist.

Laws reflect the general sentiment of communities, and it is a pleasure to note the fact that legislation regulating the practice of pharmacy has already been effected in several States, while the subject is under discussion in others. This indicates that the public is becoming convinced of the necessity for self-protection from pretenders in the pharmaceutical ranks—shows that the practice of pharmacy is above the level of an ordinary trade, and requires both experience and culture for its proper prosecution. Colleges of pharmacy are destined to rank with other institutions of learning, and, surely, they should receive the unequivocal encouragement of every reputable apothecary.

## THE MASSACHUSETTS COLLEGE OF PHARMACY.

The third annual commencement exercises of this institution were held in Boston on the 18th ultimo. Mr. S. M. Colcord gave the opening address, followed by the reading of selected theses of the graduating class and the presentation of a prize to Mr. S. D. Drury for proficiency in studies.

The valedictory was read by Professor George F. H. Markoe. He spoke of the new and enlarged field of action upon which the students were to enter, in the enjoyment of their professional rights, and referred to the associations and lessons of the occasion. As pharmaceutists, he said, they must still continue students, especially of chemistry and botany. By devoting their leisure hours to the study of science, they would ennoble their characters and elevate their profession. They should look well to the details of their art, bearing in mind that what was worth doing at all was worth doing well. The pharmacist should most carefully avoid invading the domain of medicine. The professions should be kept entirely distinct; either one affords scope for the best abilities, and there was no excuse for the practice of both by the same person. He exhorted the graduates to remember the importance of their duties and acquit themselves like men.

The diplomas were then presented to the graduating students, five in number, by the president; and the exercises were concluded by an appropriate address by Rev. M. Manning.

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We are obliged to omit from this number the continuation of Prof. Williamson's lectures on Fermentation. It will be continued uninterruptedly hereafter.

Prof. John M. Maisch has succeeded Prof. Wm. Proctor, in the editorship of The American Journal of Pharmacy. Prof. Maisch is well known throughout the country as an accomplished scholar and indefatigable worker in the cause of Pharmacy, and he will surely fulfill his editorial duties to the satisfaction of his readers, and to the credit of himself.

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Books and Pamphlets Received.—Report of The Fruit Growers Association of Ontario, for the year 1870. Forwarded by Wm. Saunders, London, C. W.

Diseases of the Womb; Uterine Catarrh frequently the cause of Sterility. New Treatment. By H. E. Gantillon, M. D. From the author.

Draft of a proposed law to regulate the practice of Pharmacy, and the sale of poisons, and to prevent the adulteration of Drugs and Medicines. Published by the New Jersey Pharmaceutical Association.

The Columbia Pharmaceutical Association. Organized at Washington, D. C., April, 1871. Constitution, By-Laws and Code of Ethics.

We are pleased to note the organization of this new association. The officers are as follows: President, W. S. Thompson; Vice-President, J. D. O'Donnell; Recording Secretary, Oscar Oldberg; Treasurer, Z. W. Cromwell; Librarian, D. P. Hickling; Curator, F. D. Dowling.

The following have also been received, from Prof. Dr. F. A. Flueckiger, Berne, Switzerland:

"Ubersicht Der Cinchonen. Von Dr. H. A. Weddell. Deutsch Bearbeited von Prof. Dr. F. A. Flueckiger."

From Dr. F. Hoffmann, New York City:

"Uber den Zustand der Chemie in Frankreich. Von Prof. Dr. Herman Kolbe, Leipzig."

"*Anæsthetics.* By Edward R. Squibb, M. D., of Brooklyn, N. Y."

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## FUR DEUTSCHE APOTHEKER.

Das Neue Jahrbuch fur Pharmacie wird in Monatsheften franco per Post nach allen Stadten der Union a 2 Doll. per Jahrgang versandt. Bestellungen wollen per Postanweisung gemacht werden bei dem Herausgeber Dr. F. Vorwerk in Speyer (Rheinbayern), oder durch Herrn apotheker Ebert, No. 584 State street, Chicago.

The above notice lately came to hand from our honored colleague, and in presenting it to our readers, we hope that many of them who are conversant with the German language will avail themselves of this opportunity, and become subscribers to one of the best of the German Pharmaceutical Journals, at the very moderate price of $2 per year.

In this connection we would offer our services to other European Journals, hoping for a reciprocation of favors; by agencies of this kind much may be done to advance professional interests.

## THE CHICAGO COLLEGE OF PHARMACY—SESSION OF 1871-2.

### FACULTY.

N. Gray Bartlett, *Professor of Inorganic and Pharmaceutical Chemistry.*
Albert E. Ebert, *Professor of the Theory and Practice of Pharmacy.*
George M. Hambright, *Professor of Materia Medica and Toxicology.*
John H. Rauch, M. D., *Lecturer on Botany.*

### LECTURE FEES.

| | |
|---|---|
| Matriculation Ticket, paid but once | $ 2.00 |
| Lecture Tickets, including all branches taught | 30.00 |
| Diploma Fee | 5.00 |

The lectures of the course will be given in the college rooms, 77 Dearborn St., commencing on the first Monday in October, and continuing over a period of twenty-one weeks. During the holidays there will be an intermission of one week

The Lectures will be given on Monday, Wednesday and Friday evenings,—two lectures each evening.

Prof. Hambright will deliver the introductory address on Monday evening, October 2d.

### *THE COURSE OF INSTRUCTION.*

### CHEMISTRY.

This course will begin with a discussion of the general nature and scope of the science, followed by a consideration of Theoretical Chemistry, including the laws of affinity and chemical combination, notation, nomenclature, &c. The elements and their combinations—especially such as are of greatest interest to the Pharmacist—will be discussed, each receiving an amount of attention due to its relative importance. The lectures will be fully illustrated by experiments and diagrams.

The modern system of chemical notation will be adopted.

The following are recommeded as Text-books: Barker's Theoretical and Inorganic Chemistry, and Attfield's Chemistry, General, Medical, and Pharmaceutical.

### PHARMACY.

The course on Pharmacy will commence with a review of the history of the United States Pharmacopœia, demonstrating the necessity of an authoritative standard for the preparation of medicinal agents.

The system of weights and measures of the United States and British Pharmacopœias, and the French or decimal system, with the subject of specific gravity, will next claim attention. The manipulations of the shop and laboratory—including powdering, solution, filtration, maceration, percolation, the generation, application and management of heat in chemical and pharmacal operations, evaporation, distillation, precipitation, crystallization, etc., etc., will be successively described. The apparatus required in these numerous processes will be exhibited, and their appropriate uses explained. All the officinal and some unofficinal preparations will be reviewed, and every article noticed will be shown. Commercial adulterations and impurities will be considered, with the means for their detection. The concluding lectures will be devoted to extemporaneous pharmacy, with practical instruction on the dispensing of medicines, and general remarks on the æsthetical relations of pharmacy.

Text-book—Parrish's Pharmacy.

### MATERIA MEDICA.

The lectures on Materia Medica will be devoted to those articles of vegetable and animal origin which are used in medicine, the proper time for collecting, and the different modes of preserving the same.

The drugs will be considered in a systematic manner, bringing together those which resemble each other in their physical properties and structure, mainly aiming to present to the student the leading characteristics for recognizing each individual drug, and the distinguishing features between those of a superior and an inferior quality. Substitutions and adulterations, with the methods of recognizing the same, will be duly considered.

The commercial history of drugs will receive attention; and products obtained from plants, and their important proximate principles, will be discussed in their therapeutical relations.

The toxicological properties of the several articles of the Materia Medica, with the proper antidotes and treatment, will receive careful consideration.

Remarks on drugs of animal origin will conclude the course. The subject will be arranged and discoursed upon in a manner similar to that adopted for the products of the vegetable kingdom.

The extensive cabinet of the college, in addition to well executed colored plates and drawings, will furnish complete means of illustration, and experiments will be resorted to for the verification of important facts. Text-Book, U. S. Dispensatory.

### BOTANY.

Instruction in this branch will commence in April, and continue through the summer months. Meetings will be held once a week for recitations on structural and systematic botany; an extensive herbarium, and well executed drawings and plates will be brought into requisition. Occasional excursions to the country will be made, affording healthful recreation and the best means of becoming practically acquainted with the growing plants.

Text-book—Gray's School and Field Book of Botany.

### QUALIFICATIONS FOR GRADUATION.

Each candidate for the diploma of this College must be of good moral character, must have arrived at the age of twenty-one years, have attended two courses of each of the lectures delivered in the College, or one course in this College, and one course in some other respectable college of pharmacy or medical college in which the same branches are taught; and have had an experience of at least four years in the drug business, of which circumstances he must produce sufficient evidence to the Board of Examiners. He shall also be required to present an original dissertation or thesis upon some subject of the Materia Medica, pharmacy or chemistry, which shall be written with neatness and accuracy.

The thesis, with the evidence of requisite experience, and diploma fee, shall be deposited with the Secretary of the College on or before the twentieth of February of the session in which the application shall be made. He must also be recommended in writing by the Committee of Examination and the Professors jointly, and if his application be finally approved of by the Board of Trustees, he shall receive the Diploma of the College.

### EMPLOYMENT.

Whenever practicable, students should procure situations during their attendance at the lectures; in such cases the remuneration will usually cover the expenses incurred during the course. The lecture committee will keep a register of the names of all applicants for situations, and will endeavor to find employment for as many as possible; but a small proportion, however, of those who apply can obtain suitable situations, and those who do not, will be at an expense of from $5 to $8 per week for board.

For any further information, apply to

PROF. ALBERT E. EBERT, *Chairman of Lecture Committee,*
Corner of State and Twelfth Sts.

THE PHARMACIST

AND

CHEMICAL RECORD.

VOL. IV. CHICAGO, JULY, 1871. No. 7.

# OPIUM.

BY R. ROTHER.

The great importance of opium as a medicinal agent requires, and the peculiarity of its constitution admits, a very definite adjustment of its power. It has long been the effort of leading pharmaceutists to popularize a system for definitely standardizing the activity of crude drugs or their preparations. But only a very limited number of these substances have thus far yielded desirable results by the practically applicable methods of analysis at present known.

It is exceedingly fortunate, however, that opium—one of the most valuable in the materia medica list—can be so easily and accurately assayed. The standard of quality is based upon the quantity of its chief constituent, morphia, and the method of isolating it for this purpose is founded upon the original process of Sertuerner, by whom "the alkaloid" was discovered.

Among the numerous alkaloids and other principles of opium, are several besides morphia of acknowledged power, as opianina and papaverina, for example, but these are found only in minute proportion. There is another at least of medium power, but much inferior to morphia both in effect and quantity, called codeia, and another occurring copiously, but medicinally inert, named narceina, and one entirely destitute of narcotic properties, performing the function of a powerful tonic merely, and strangely denominated narcotina, in quantity exceeding all the others but morphia. Together with these a considerable quantity of undetermined or unknown compounds of a more or less active character, complete the list of ingredients to which opium owes its activity, and for all, taken as a whole, the gauge is the morphia strength.

The serious nervous disturbance following the usual effect of opium on the system, is attributed to an exceedingly subtle and as yet undetermined substance. But it has been found that ether will thoroughly remove this noxious and objectionable body. In consequence, a number of opium preparations, proprietary and otherwise, are in general use, all differing from ordinary opium compounds, by the reason that the preliminary action of ether was resorted to. The noxious substance however, seems to be but sparingly soluble in water; so, then, a preparation made with an aqueous extract of opium, may possess an approximate identity to one made of opium purified by ether.

The elegant and unsurpassable deodorized tincture of opium of the Pharmacopœia, is as yet comparatively unknown; but its virtue is only apparently eclipsed by similar yet secret preparations, whose only merit over it is the advantage derived from a priority of introduction into general use through the customary system of advertising, and probably, also, a uniformity in morphia strength, determined by assay.

Although it is an officinal requirement that all opium entering into the compounds of the Pharmacopœia should contain seven per cent. of morphia, the direction is rarely observed, and therefore an inferior opium employed otherwise according to the Pharmacopœia, will necessarily yield but a worthless or very weak preparation However, now it is generally agreed that when opium is directed officinally, as in the preparation of Tincture of Opium, it should contain ten per cent. of morphia, or four grains of the pure alkaloid in the fluid ounce of the tincture.

Comparatively simple as the process of isolating the morphia for the purpose of assay may be, it still requires especial precaution and considerable experience to obtain strictly reliable results. In view of this fact we have numerous methods, each with its particular advantages, proposed to attain the desired end. But in most cases, and especially in doubtful ones, two separate assays are usually performed, and if possible by different yet equally accurate methods. To obviate this inconvenience, and insure a perfectly conclusive result at once, the number of these processes still accumulates.

The most prominent methods of assay are as follows:

The process of Merck is to boil half an ounce of opium first with eight ounces then, with four ounces of proof spirit, filtered, and the filtrates evaporated to dryness after the addition of two drachms of disodic carbonate. The brown residue is introduced into a tall cylindrical glass vessel and softened with water, the colored supernatant liquid poured off, the residue again washed with water and then brought in contact for one hour with cold alcohol, sp. gr. ·85. The mixture is now poured upon a filter, the residue washed with alcohol, and then dissolved in half an ounce of distilled vinegar previously mixed with its bulk of water, the morphia again precipitated from the filtrate by the addition of a slight excess of ammonia, and after twenty-four hours the precipitate is poured into a filter, dried and weighed.

Duflos exhausts opium with cold water, adds one-eighth of its weight of monopotassic carbonate and sets the mixture aside for twelve hours.

The liquid is then filtered from the precipitated narcotina, and boiled until the effervescence of carbon dioxide has ceased. After twenty-four hours the morphia has all precipitated as a crystalline powder, and in order to free it entirely from adhering narcotina, it is again dissolved in very dilute sulphuric acid, the solution mixed with alcohol, until the whole liquid weighs nine-fourths as much as the opium employed, and the morphia reprecipitated with a slight excess of ammonia.

According to Mohr, the opium is three times successively treated with water, the liquids united, evaporated, filtered and poured into boiling milk of lime, containing one-sixth to one-quarter as much calcium hydrate as the weight of the opium-used. After boiling a few minutes the mixture is poured on a linen strainer, the precipitate washed with boiling water and finally pressed. The strained wine yellow liquid is now reduced by evaporation to twice the weight of the opium, and filtered if necessary. This is now heated to boiling and the morphia precipitated by addition of ammonium chloride equal to one-sixteenth of the opium used. By solution in dilute chlorhydric acid and treatment with animal charcoal, the morphia can be further purified.

By a fourth method, the aqueous infusion of opium is treated with plumbic acetate as long as a precipitate occurs; this is collected on a filter, and washed with water until the filtrate is not perceptibly bitter. The excess of lead is now precipitated from the filtrate with sulphydric acid; the lead sulphide left in contact with the liquid for some time, then filtered, and the wine yellow filtrate cautiously treated with ammonia. A resinous precipitate containing narcotina is thereby separated, which adheres tenaciously to the walls of the glass. The liquid is now poured off and the morphia precipitated by a further addition of ammonia.

Instead of using water the opium can also be exhausted with dilute acetic acid. The liquid repeatedly evaporated after adding fresh portions of water until the excess of acid is expelled and the narcotina, together with extractive, has become insoluble. The morphia is then precipitated with ammonia, washed with water and alcohol, and finally crystallized from absolute or ninety per cent alcohol.

According to Thiboumery, opium is three times successively treated with cold water, and the infusions evaporated to a syrupy consistence. The extract is mixed with water, poured on a filter, and the residue washed with water until decolorized. The filtrate is now boiled and precipitated with ammonia; after cooling, the precipitate is filtered off, washed first with cold water then with alcohol, sp. gr. .94, until decolorized, and dissolved in boiling alcohol, sp. gr. .84, with the addition of animal charcoal, filtered, and the morphia crystallized from the solution.

Guilliermond rubs the opium, first broken into small fragments, three times with three times its weight of alcohol, 71 per cent, and filters into a wide mouthed bottle containing ammonia equal to one-quarter the opium used. After twelve hours, rather large colored crystals of morphia separate; together with small shining crystals of narcotina. The crystals are then poured on a linen strainer, washed with water, dried, and then thrown into water; the morphia sinks to the bottom, whilst the narcotina remains suspended and can be poured off.

By the method of Fordos, the opium, cut in slices, is first macerated with four times its weight of water, for twenty-four hours. The mixture is then thoroughly rubbed up in a mortar and poured on a filter; when the liquid has flowed off, a second and then a third portion of water, equal in weight to the opium, is poured on. One-third of the mixed liquids is then precipitated with ammonia, to determine the requisite amount for the remaining two-thirds. To the remaining liquid an equal volume of alcohol, 85 per cent. is added, and twice the quantity of ammonia first used. The mixture is now agitated and transferred to a bottle, well stopped, and allowed to stand for two or three days. The deposited crystals are now poured on a filter, washed with weak alcohol, about 40 or 50 per cent., and then treated with ether, after this with chloroform, and again with ether; after drying, the crystals are weighed as pure morphia.

By Staples' process (the officinal process), opium is first macerated with five times its weight of water for forty-eight hours, then exhausted with cold water, the infusion evaporated to about eight times the weight of the opium, and about an equal volume of officinal alcohol added; to this an excess of ammonia, previously mixed with alcohol, is added in two portions, after an interval of twenty-four hours; at the end of twenty-four hours, the deposited morphia is first washed with a little diluted alcohol, then with water; dried and weighed.

From these various processes, we observe that the best method for exhausting the opium of its morphia is the treatment with cold water, preceded by a maceration; it is also seen that ammonia is the final precipitant in every case, and, with the exception of the third and fourth methods, alcohol is used in every instance to decolorize the morphia. In nearly every process the adhering narcotina is separated by again dissolving the impure morphia in some dilute acid, and precipitating it a second time. But in the method of Fordos, ether and chloroform are used for this purpose.

Now, to understand the relative value of all these processes, it must be known that morphia is insoluble in alkaline carbonates, quite soluble in ammonia (one grain dissolving in about 100 of the ordinary 18 per cent. ammonia), soluble in 1,000 parts of cold water, and in 500 when hot; it is also soluble in about 100 parts of strong alcohol, which solubility gradually approaches that of water as the alcohol is weaker; it is insoluble in ether, but soluble in 60 parts of chloroform. One grain of pure morphia will also dissolve, after a few moments shaking, in a mixture of five fluid drachms of strong alcohol, four fluid drachms of water, and one fluid drachm of chloroform. But the same quantity of morphia is scarcely if at all diminished by a mixture of four fluid drachms each of strong alcohol, water and ether. The writer believes that the exceeding solubility of morphia in chloroform may sometimes be due to acidity of the latter, and, therefore, chloroform should never be used for purifying the morphia in opium assays. Ammonia, although used in all the processes, is objectionable because an excess is required first to separate the morphia completely; and as it is difficult to ascertain the exact amount in each case, an immoderate excess may again dissolve some of the morphia or prevent its precipitation. For this reason, a fixed alkaline carbonate is greatly preferable as a precipitant, and its employment for this purpose really constitutes the second stage in the methods of Merck and Duflos. Aside from the use of alkaline carbonate, these two processes—but especially the original and ingenious one of Duflos—also furnish the groundwork for all the others, with the exception of the second stages of Mohr's, and the fourth method above given. The methods of Guilliermond, Fordos and Staples, are also very objectionable, firstly, that the morphia is precipitated from solutions that are too dilute, and, secondly, that these solutions are alcoholic; because, if even two and a half fluid ounces of water will retain one grain of morphia in solution, the same volume of alcoholic liquid will dissolve much more. Moreover, as morphia will remain in such a solution more abundantly than if it were precipitated as a crystalline powder from a concentrated aqueous solution, and then treated with the same volume of these solvents.

If in an alcoholic solution ammonia is used as a precipitant, it is utterly impossible to know when the proper quantity has been added, unless determined by a preliminary trial according to Fordos. However, the writer has found the case to be quite different with a concentrated aqueous solution. If to such a solution ammonia, moderately dilute, be added drop by drop, with constant stirring, the gelatinous precipitate at first produced immediately contracts and rapidly subsides the moment a sufficiency or slight excess of ammonia has been added. The writer thinks this to be an exceedingly practical and important indication in the use of ammonia as a precipitant. The same observation was made with disodic carbonate, only the precipitation is less rapid at first than with ammonia.

Morphia exists in opium combined with sulphuric and meconic acid, but often entirely with the former when the latter is absent. The meconic acid is tribasic and the alkaloid, or any other monad base, can form with it either monobasic, dibasic or tribasic meconate. The trimetallic salts are usually the most soluble, and the monometallic, or so called acid salts, the least. Morphia originally exists in the opium when in combination with meconic acid, always as the tribasic or normal salt, owing to the constant deficiency of meconic acid. When morphia is precipitated by ammonia or disodic carbonate from its native union with meconic acid, the reaction may take place, as is shown in the following equations:

$$C_7H\ (C_{17}\ H_{19}\ NO_3)_3\ O_7 + 3\ (CO_3\ Na_2)\ + 3\ (H_2O) = 3\ (C_{17}\ H_{19}\ NO_3.\ H_2O) + C_7H\ Na_3\ O_7 + 3\ (CO_3\ NaH)$$

$$C_7H\ (C_{17}\ H_{19}\ NO_3)\ _3O_7 + 2\ (CO_3\ Na_2) + 3\ (H_2O) = 3\ (C_{17}\ H_{19}\ NO_3.\ H_2O) + C_7\ H_2\ Na_2\ O_7 + 2\ (CO_3\ NaH)$$

$$C_7H\ (C_{17}\ H_{19}\ NO_3)\ _3O_7 + CO_3\ Na_2 + 3\ (H_2O) = 3\ (C_{17}\ H_{19}\ NO_3.\ H_2O) + C_7\ H_3\ Na\ O_7 + CO_3\ NaH$$

The writer, after numerous trials of these various methods, has devised a process which, for accuracy, speed and simplicity, is equal to any and superior to most, and therefore recommends itself for the use of pharmaceutists generally.

This process is a modification of the methods of Merck, Duflos and Fordos. The opium, if moist or in powder, is first subjected to maceration, then transferred to a filter and treated with cold water until thoroughly extracted, the filtrate evaporated to a small bulk and treated (without filtration, because the sediment of narcotina, if any, is effectually removed in the subsequent part of the process) with a concentrated solution of disodic carbonate. This precipitates, besides morphia and the usual amount of coloring matter and narcotina, nothing that water, alcohol and ether cannot dissolve. Opium contains no soluble mineral matter that could possibly enter the aqueous solution, and then be precipitated as an insoluble carbonate, unless such were fraudulently added, which is not known to be the case. However, it is worth while here to state that if glycerin were added to keep the opium moist, all the present methods of assay would be entirely unavailing, as the glycerin would retain much of the morphia in solution, despite ammonia or disodic carbonate. After six to twelve hours, the precipitate is poured on a balanced filter, first washed with a little water, then with a mixture of equal measures of strong alcohol, water and ether, until decolorized, dried and weighed. The first objection that might be raised against this process is, that the morphia is at once precipitated from the concentrated liquid obtained by evaporating the aqueous infusion. But the writer has found that it is utterly useless to filter this liquid, because only loss of time and material is incurred, and nothing whatever gained. The greatest amount of sediment in such a solution—resulting from 200 grains of opium—that the writer ever noticed, weighed only three grains, and was completely soluble in diluted alcohol. The second objection might be, that the morphia obtained by precipitation with alkaline carbonate can be contaminated with earthy carbonates, but the precipitate is perfectly soluble in caustic alkali.

The peculiar advantages of this process are, firstly, that the morphia solution is never removed from the vessel in which it is concentrated.

Secondly, that the precipitant can be used even in large excess without danger of dissolving the morphia.

Thirdly, that when the morphia is precipitated from a concentrated aqueous solution, it is less colored and much more easily and thoroughly decolorized subsequently than when precipitated from a concentrated alcoholic solution.

Fourthly, that with an aqueous solution no extra precautions need be taken to prevent inordinate evaporation, as is the case with an alcoholic liquid; the dish requires simply to be covered and set aside, to give the morphia time for complete separation.

Fifthly, that the morphia is poured on a tared filter, from which it is not removed again until washed, dried and weighed.

Sixthly, that the morphia is not decolorized with weak alcohol in one operation, and freed from adhering narcotina by means of ether in another; but that this operation is performed in one process more expeditiously and thoroughly by the use of a mixture of alcohol, ether and water, with which the morphia is thoroughly mixed by means of a small glass rod after each new addition of the mixture.

The necessary apparatus, when reduced to a practicable minimum, is summed up in an ordinary druggists' prescription scale that will weigh accurately to the fourth of a grain; a four-ounce porcelain capsule, a small earthenware pestle, a very small and blunt edged glass rod, a 5-inch ordinary filter, two 4-inch filters, which, after being dried, must be exactly equal in weight, a small glass funnel with a slant height of two and a half to three inches, an ordinary six or eight ounce wide mouthed bottle, a small flexible steel spatula, a piece of sheet-iron covered with a thin layer of sand for a sand-bath, and any vessel of convenient size and shape containing hot water, to serve as a water-bath.

The assay is now performed as follows:

Two hundred grains of opium—whether in powder or moist lump—is always taken, for the object of greater accuracy. If it be in the latter form, it must first be broken into small fragments before weighing. It is then placed in a porcelain capsule of convenient size, and two fluid ounces of cold water poured on; after a maceration of several hours, the mass is stirred up with a small pestle, and this operation frequently repeated during a maceration of six or eight hours, or until the fragments have become perfectly disintegrated; one or two fluid ounces of cold water are now added, stirred up, and the magma poured into a five or six-inch filter, previously adjusted in a funnel and moistened with water; when the liquid, which is collected in a six or eight-ounce wide mouthed bottle, has flowed off, more water is poured unto the opium, some of it having first been used to wash the capsule and pestle. Immediately after each addition, the mass on the filter is carefully stirred up with a small glass rod, and this is several times repeated in the beginning, but latterly the residue is left at rest, and water continuously poured on until twelve fluid ounces of filtrate has accumulated. This liquid is now poured into the capsule again, in portions of two or three fluid ounces—as fast as the filtrate collects—placed on a sand-bath moderately heated, and evaporated to about one and a half fluid ounces. After cooling, forty to sixty grains of disodic carbonate, previously dissolved in two fluid drachms of water, is added, stirred with a glass rod, the mixture covered up and set aside for six to twelve hours to give the morphia time for complete separation. Two four-inch filters, well dried, are now exactly balanced, one of them layed aside and the other placed in the funnel and moistened with water. The liquid with the precipitated morphia is now stirred with a spatula and poured into the filter. By means of the spatula the precipitate adhering to the dish is perfectly removed, and washed into the filter with a portion of the filtrate already collected; the dish is then further washed with small portions of distilled water, and the washings also rinsed into the filter. The precipitate, after being washed with more water, using about four to six fluid drachms in all, is then treated with a mixture of five or six fluid drachms each of strong alcohol, water and ether, until the filtrate is colorless, or nearly so; the above quantity is about sufficient for the purpose. The mixture also must have perfectly cooled before it is used. A portion is first poured on to the precipitate and carefully stirred with a glass rod, and the process repeated after each addition of the liquid, until finally the precipitate contracts, assumes a granular appearance and falls to the bottom of the filter. The stirring up of the precipitate is important in this part of the process, as through it a very effectual washing of the morphia is secured with the least possible quantity of menstruum. The morphia can also be decolorized, first with a mixture of one fluid ounce each of strong alcohol and water, and the narcotina then removed by washing with ether. But then it requires much more of the latter (about two fluid ounces), and the morphia must always be digested a short time with each new portion added. The filter containing the morphia is now detached from the funnel, laid on several thicknesses of unsized paper for a short time to remove most of the adhering liquid by absorption, and then dried, either by exposure in a warm place, but best on a water bath by being placed on a sheet of filtering paper in a porcelain dish, floated on hot water. The empty and also dry filter is then laid on one side of the balance, and the one holding the precipitate in the other; the weight of the morphia thus obtained is divided by 2, and the result indicates the percentage in grains. The morphia is in the form of a grayish-white granular powder.

When making preparations of opium—as laudanum, for instance,—it is necessary to exhaust the opium first with the menstruum; then using a quantity of the liquid representing 200 grains of opium, evaporating off the alcohol, diluting the residue with water, filtering to separate the resinous matter dissolved by the alcohol, evaporating the filtrate to a small bulk, and determine the morphia as above directed. From this the whole amount of morphia in the concentrated liquid is calculated, and this diluted so that every fluid ounce of the diluted liquid, or in other words laudanum, shall contain four grains of pure morphia in the fluid ounce. If the opium should be deficient in morphia, and the first liquid obtained have less than four grains in the fluid ounce, then the requisite quantity of an assayed opium must be added to furnish the necessary amount of morphia.

In adjusting the strength of deodorized tincture of opium, a quantity of the aqueous infusion, before evaporation, corresponding to 200 grains of opium, is treated precisely according to the above method of assay from the beginning. The writer believes that although the ether removes the odorous substance, but very little of the narcotina is removed, and consequently that would contaminate the morphia unless this were subjected to the whole routine of the assaying process.

The writer has observed that when an aqueous solution of opium is treated with ammonia or disodic carbonate; the characteristic fruity odor of deodorized tincture of opium is almost instantly developed; the same occurs, but more slowly, when an alcoholic solution of opium is first largely diluted with water and then subjected to the same agency. This is also effected in an ordinary alcoholic solution, but the deodorization progresses very slowly. These indications would second the plausible view that the fine aroma and the so-called narcotic odor of opium are due to two distinct substances, existing originally side by side in the opium, but that the extreme delicacy of the former is completely concealed by the powerful predominance of the latter. It is almost certain that the substance possessing the narcotic odor undergoes an entire change in contact with the alkali, because it can not be reproduced by the subsequent addition of an acid, which would probably be the case were it an acid body that had combined with the alkaline base. It is highly probable then, that the noxious body removed by the ether is the substance destroyed by the alkali. If this were true, the deodorized tincture of opium could be much more economically and expeditiously prepared, by adding ammonia or disodic carbonate, and then restoring the disturbed equilibrium again by neutralization with sulphuric acid.

The magnificent and useful preparation called "Liquor Opii Compositus," invented by Dr. Squibb, is much used in some localities. But the process of Dr. Squibb is too scientific for general use. About six months ago the writer had occasion to prepare some, and in order to render the process practicable was compelled to make some alterations. This article at the present time is as beautifully clear and fragrant as when first prepared.

Dr. Squibb's preparation is of the laudanum strength in morphia—that is, one fluid ounce contains four grains of the pure alkaloid, equal to five grains of the sulphate, and thirty minims of it are composed as follows:

| | |
|---|---|
| An assayed so-called depurated solution of opium | 14 minims. |
| Strong Alcohol | 13 " |
| Chloroform | 1 minim. |
| Acetic Ether | 2 minims. |

This gives 16 minims of chloroform and 32 minims of acetic ether in the fluid ounce. But the writer was called upon to furnish it at once, and seeing that it was practically possible to comply, prepared it extemporaneously as follows: Having at hand deodorized tincture of opium, acetic ether, and Dr. Murdock's solution of chloroform in glycerin, containing 17 minims of chloroform in the fluid drachm.

For one fluid ounce of Liquor Opii Compositus, approximately, Take of

| | |
|---|---|
| Deodorized tincture of opium | 7 fluid drachms. |
| Dr. Murdock's chloroformic solution | 1 fluid drachm. |
| Acetic ether | 32 minims. |

Mix.

The writer believes with Dr. Squibb that in this preparation the alcohol should be a minimum. Therefore, a preparation having the alcoholic strength of deodorized tincture of opium, or even weaker, is much better. This is secured by the use of Dr. Murdock's solution of chloroform in glycerin, and the process given by him is as follows:

Place 3 fluid ounces of glycerin in a conveniently sized mortar and rub up with it by gradual addition one fluid ounce of chloroform; introduce this mixture into a bottle to let a little undissolved chloroform subside, and then after separating it, rub this up with another fluid ounce of glycerin, and mix the whole together. This is a permanent solution, and is miscible with water in all proportions.

By this means an accurate formula for Liquor Opii Compositus would be as follows, for 2 pints: Take of the assayed concentrated solution of opium purified by ether according to the Pharmacopœia, a volume corresponding to 128 grains of morphia.

| | |
|---|---|
| Strong alcohol | 7 fluid ounces. |
| Dr. Murdock's solution of chloroform | 4 fluid ounces. |
| Acetic ether | $17\frac{1}{15}$ fl. drachms. |

Water sufficient. Mix.

## SOPHISTICATIONS.

### EXTRACT OF MALT.

EDITOR PHARMACIST: Permit the undersigned to comment, through your valuable columns, upon the article which, under the above caption, appeared in your May number.

While it is highly desirable to examine closely and with critical eye, all preparations used for the cure or relief of disease, this should always be done in the interest of science and truth, and strictures upon preparations and preparators should contain the truth, the whole truth, and nothing but the truth, without any side issues.

Having no reason to believe that Mr. Clacius, whose name appears under the above article, has any motive but the one he should have, we are surprised to see the gentleman of education commence his criticism (?) with a sneer at Louis Napoleon, simply because the latter is unfortunate.

"Kick him while he is down," is an ugly war-cry for so critical a gentleman, even if he has reason to be proud of the long German procession in honor of peace. While we are as German as Mr. Clacius, we shall ever cherish the recollection of Napoleon and his great Industrial Exhibition,—the greatest that any of us recollects, and at which we were honored with that distinction which gives us *a right* to use Napoleon's vignette on our preparations.

Before having the same on our labels, we sold a great deal of Extract of Malt to customers who indicated their satisfaction by continuing to favor us with their patronage up to date; and we did by no means use it to pretend merits not contained in the preparation itself. We not only desire, but are anxious, to see criticism upon our preparations. But how can we like it, if the critic (as Micawber says) is not a critic, acknowledging in his very critical article, on line twenty-one, "that it is difficult to give an exact test for the purity of extract of malt." From the fact that, heated in an iron spoon, our Extract yielded to Mr. Clacius the odor of impure glycerine, the deduction is made that impure glycerine is used for the preservation of the Extract.

Mr. Clacius ought to know that the odor of all impure glycerine is produced by acroleine, generated by exposure to a high temperature, and that the very purest glycerine, placed over a spirit lamp, will yield acroleine. He ought to know, furthermore, that acroleine, as also the notrogen derivatives, produced by the heating of the albumen of the extract of malt, being more volatile, will cover up the odor of caramel to a large extent; and if he, as he condescends to approve of, adds one-eighth part of glycerine to the extract, he will always obtain the odor of acroleine, if the extract of malt is otherwise pure. If, on the other hand, "a very large yield" of extract is obtained from the malt, which then miraculously contains some cane-sugar, as we found in some extract made by a druggist in this city, then the odor of caramel will predominate. Sugar of any kind being present in but a small quantity in good extract of malt, if the conversion is carried on properly, not too far, when the odor of caramel cannot be very intense.

When we commenced making extract of malt, we made it pure. But during the following hot season we added, after consultation with some prominent druggists of this city, some glycerine, to prevent fermentation, the glycerine being of at least as good a quality as the best in Mr. Clacius' store. At that time we made some extract of malt which did not suit us as a perfect preparation, but upon solicitation of some of our customers.

We published our objections to this preparation, which, nevertheless, was wanted in that very state, in the November number of *The Arts*, page 66, where we state that gradually only we are enabled to displace from the market the burnt extract with a more pleasant preparation.

If we recollect right, Mr. Clacius has not bought of us any extract of malt for over a year or more, and we are therefore surprised at his statements, in contradiction of which we insist upon establishing the following points:

1. That any person can drink one or two pounds of our Liebig's Extract of Malt with comfort, and without nausea, of which Mr. Clacius complains, even himself, unless he has previously tasted a dozen or two of Hoff's or Huck's Extract of Malt, or unless he pushes his longest finger (at the end of which he seems to have his nauseating knowledge) into his mouth.

2. That our Extract of Malt is *extract of malt*, *made from malt*, in contradiction to the false insinuation of Mr. Clacius.

3. That our Extract of Malt contains *no glycerine whatsoever*, although we warrant it to keep unfermented throughout the summer. Having found a proper mode of preserving it unfermented without the addition of any foreign substance, we abandoned the use of glycerine in this instance a considerable time ago.

All these points we insist upon Mr. Clacius to decide by a committee of twelve of the best druggists, or druggists and physicians, of Chicago, *all to be chosen by himself*. In order to stimulate Mr. Clacius to haste, we promise him, in case all the above points are not established in our favor, all of the best Vienna Extract of Malt Huck ever produced, that he can bear without or with nausea; and we hope, as he consistently cannot evade the justification, we demand, that he will not let us wait for the same.

As soon as these points are established, we shall tell Mr. Clacius "how an *exact* test of the purity and general quality of an extract of malt can be made," which, in his article, he acknowledges too difficult for himself, or, in other words, which he acknowledges he cannot do, while at the same time he undertakes to palm off upon your readers his critique, based upon facts which he acknowledges himself unable to establish. Though we have never before enjoyed the privilege of reading the mental effusions of Mr. Clacius in print, we hope to see some more at an early date; but hope, also, that in future Mr. Clacius, when he does write, will select a theme he does know something about, and the want of knowledge of which he need not acknowledge unasked in his very article.

We remain, very respectfully, yours, &c.,

J. M. Hirsh & Co.

# ON BENZOATING OINTMENTS EXTEMPORANEOUSLY. —AN INAUGURAL ESSAY.

BY CHARLES F. BOLTON.

The subject of benzoin in ointments has for some time past attracted the attention of the profession, and there is nothing in the whole range of pharmacy that gives more satisfaction than a perfect ointment, not only to the druggist who dispenses it, but also to the physician who prescribes, and the patient who uses it. There is nothing that reflects more credit on the pharmacist than an elegant and well dispensed ointment. To accomplish this requires not only experienced manipulation, but something more; it needs that the unctuous matter should be fresh and free from the least trace of rancidity; it should not only be this way when dispensed, but if possible should be made in such a manner that it would remain in a perfectly sweet condition for a considerable length of time, thus affording the patient an opportunity of using the whole of the ointment in a sweet state. This can be effected in many instances by using the officinal unguentum benzoini as the base of the ointment, but often the physician directs the ointment to be prepared and benzoated extemporaneously. To benzoate the ointment by the officinal process involves time, but by the plan that I suggest it can be accomplished in a very short time without the aid of heat, thus saving a great deal of time and trouble. In many instances time is quite an important object. The formula that I have decided upon, after making several experiments, is as follows:

| | | |
|---|---|---|
| ℞ | Benzoin pulv. (select.) | ℥ ij. |
| | Ether sulphuric | ℥ iv. |
| | Ol. Ricini | ʒ j. |

Introduce the benzoin into a eight ounce bottle, add the ether, macerate for twenty-four hours with frequent agitation, pass through a filter, to the filtrate add ol. ricini, and shake until dissolved; then transfer to a shallow vessel in order to allow the ether to evaporate spontaneously; lastly, when the ether has entirely disappeared, place in a wide-mouthed bottle ready for use. With a view to economy I experimented with alcohol and benzine as solvents; the former of the specific gravity ·817 gave moderate satisfaction, the result being of a much darker color, owing to the foreign matter in the benzoin being more soluble in alcohol than in ether. This I considered a serious objection, as it discolored the ointment considerably, while that made with the ether did not, at least not more than if it were benzoated by the officinal process. The benzine experiment, however, was a complete failure, it extracting from the benzoin only a very small amount of benzoic acid, leaving entirely undissolved the resin, cinnamic acid, and volatile oil. The result from the formula that I have given is of the consistency of a soft extract, one ounce of the extract fully representing an ounce of the benzoin in a state that is perfectly miscible with unctuous substances. I benzoated several ointments with this extract in the early part of last April, and allowed them the greater portion of the time to be exposed to the atmosphere, and when I examined them in the fall I could find none of them oxidized in the least, and in the case of ung. hydr. oxidi rubri, the bright orange color was perfectly preserved. I also used it in several prescriptions, and it always gave perfect satisfaction. I used it in the proportion of half drachm to the ounce of ointment; it can also be used very advantageously in preparations for the hair, it being very soluble in alcohol, and perfecily miscible with ol. ricini in combination with alcohol, but insoluble in the fixed and volatile oils in a free state. It is also freely soluble in chloroform.—*Am. Journal of Pharmacy.*

## THE DETECTION OF ALUM IN BREAD.

At the seventeenth session of the Glasgow Chemists' and Druggists' Association, R. Carter Moffat, Esq., Ph. D. F. R. S. A., (hon. member), delivered a short but highly interesting lecture on "The Detection of Alum in Bread."

He explained some of the many processes recommended by chemists for this purpose, stating that for many years it had been one of the most difficult problems to solve. He (the lecturer) had been engaged some months ago, professionally, to report as to whether alum was really present in some breads, as alleged. His attention was thus drawn to the untrustworthiness of some of the tests and the awkwardness of others; and after performing about two hundred experiments, the matter seemed to him to be as far from solution as ever. He had, however, come upon the process known as Mr. Horsely's, of Cheltenham, which recommends the bread to be placed in vinegar for a short time, the vinegar to be strained off, and a little ammonia to be added to the clear liquor, to neutralize the acid. An alcoholic solution of logwood was then added, which, it was stated, gave the solution a blue color when alum was present. Fourteen loves had been given him to test, and with Mr. Horsely's process every one of them contained alum; but in experimenting further, he found that the blue color was produced when no alum was present, and that the most reliable test for detecting the presence of alum in bread or flour, was the simple alcoholic solution of logwood, without any of the burning, boiling, or other processes. One hundred and twenty grains of chip logwood, digested in eight ounces of methylated spirits for eighteen hours, then filtered, yielded a solution which, when brought in contact with bread or flour free from aluminium, produced a pale-yellow or straw color, but a dark red when aluminium is present. With this test he had found that only one of the fourteen loaves contained alum—showing that alum is not used so extensively for the purpose of whitening bread as has been supposed by many.—*Amer. Chemist.*

## ON THE ASSAY OF SOAP.

M. F. Schulze communicates to the *Journal de Pharmacie et de Chimie* a rapid and convenient method of estimating the value of soap. The method is the same as that adopted for estimating the hardness of potable water, *i. e.*, it is based on the fact that lime water precipitates a solution of soap, yielding a liquor which does not give a persistent froth by agitation. The process is conducted as follows: A standard solution of lime is made by dissolving 1.6 grammes in water, with a little caustic soda, and making up the solution to one litre. Five grammes of the soap are weighed and dissolved in boiling water; the solution is allowed to cool, and is made up to a determinate volume, say 100 c.c. for soft soap, 200 c.c. for hard soap. Three c.c. of the standard lime solution are now added to 20 c.c. of distilled water, and to this diluted solution the soap liquor is added gradually from a burette. At first, the soap added is precipitated by the calcareous water, and a persistent froth is not produced by agitation; but, after a time, a point is reached at which the froth becomes persistent. The volume of soap solution requisite to produce this effect is then noted; the quantity is smaller the better the quality of the soap. If, moreover, an assay has been made on a sample of soap of standard value, a very exact appreciation of the value of any given sample of soap may be subsequently obtained by comparing the results.—*Ch. and Druggist.*

## LABORATORY NOTES.

BY E. B. SHUTTLEWORTH.

### UTILIZATION OF RESIDUE IN MAKING TINCTURE OF MYRRH.

In preparing this tincture by the directions of the British *Pharmacopœia*, a residue of about two-thirds of the original amount of myrrh remains. This consists almost entirely of gum or arabin, as the spirit of 84 per cent., used for percolation, exhausts the myrrh of resin and essential oil, leaving the gum, with the ordinary mechanical impurities, as sand, bits of wood, bark, &c. It occurred to the writer that this might be utilized as mucilage; and to put the idea into execution, the residue of the percolation of 52 pounds—the quantity required for 50 wine gallons of the tincture—was dissolved in boiling water, strained, and allowed to deposit. Twelve gallons of very tolerable mucilage was obtained, and which, although unfit for sale, or the nicer purposes of trade, was found an excellent substitute for ordinary paste, possessing unlimited keeping qualities, but scarcely as adhesive as mucilage from gum arabic. The latter property may, however, be given by the addition of a small quantity of molasses; and thus prepared, the mucilage will be found quite acceptable, and, certainly, cheap enough.

While speaking of tincture of myrrh, it may not be out of place to allude to a plan for its preparation which was proposed by an American pharmaceutist, and which has, to some extent, come into use. It consists in forming an emulsion of the drug with hot water, and mixing this with alcohol. The resulting tincture is deep-colored and quite thick, conveying the vulgar idea of *strength.* Strong it is, but not in aroma, or fragrant resin. The practice cannot be discountenanced too strongly, as not only is the preparation quite different from what the *Pharmacopœia* requires, but the product is a sticky abomination.

### ADULTERATION OF LARD.

Some time ago, the stock of prepared lard being exhausted, a quantity was procured from a respectable pork-dealer. It was beautifully white; so much so, that the writer was led to question his ability to produce anything equal to it. The first trial was in preparing ointment of nitrate of mercury. The color, when the mercurial solution was added, was the reverse of citrine, indeed, decidedly saturnine, developing in a short time to a full slate color. Surprised at this unprecedented result, the usual precautions having been taken as to temperature, etc., the lard was suspected, and, on examination, was found to contain a large proportion of lime. Some time after, being in conversation with a lard-renderer, a hint was dropped as to the relation of lime to color, when the information was confidentially imparted that a common practice among lard-dealers was to mix from two to five per cent. of milk of lime with the melted lard. A saponaceous compound is formed, which is not only pearly white, but will allow of the stirring in, during cooling, of 25 per cent. of water. So much for appearances.

### EXTRACT OF VANILLA.

The pods are commonly recommended to be rubbed up with sugar. A plan we have adopted gives more satisfactory results. The pods are first cut into short lengths with a pair of shears, and are then ground, or pounded, with the addition of a liberal amount of clean, broken glass (old bottles). The powder may be made of almost any degree of fineness, and the ground glass assists materially in the percolation. Fifty pounds of vanilla may be completely exhausted by twenty gallons of spirit.—*Canadian Pharmaceutical Journal.*

## SYRUPUS CALCIS LACTO-PHOSPHATIS.

BY WILLIAM NEERGAARD.

In the *Archives Generales de Medecine* for December, 1869, and for January and February, 1870, Dr. L. Dusart recommends the use of a new preparation, which he terms the lacto-phosphate of lime, in which the lime salt is dissolved in free lactic acid.

Dr. B. W. McCready, of our city, requested me to prepare a syrup containing that compound, and I adopted the following formula:

| | |
|---|---|
| Concentrated Lactic Acid | fl ℥ i. |
| Magma of freshly precipitated Phosphate of Lime, | q. s. |
| Aquæ Fl. Aurant. | fl ℥ iss. |
| Aquæ puræ | q. s. ad fl ℥ viij. |
| Sacchari Albi | ℥ xj. |

Mix the lactic acid with two fluid ounces of water, and saturate it with the magma. Put the liquid upon a filter, and add the rest of the water until 8 fluid ounces of filtrate are obtained. Pour this upon the sugar, contained in a bottle; shake occasionally until solution is effected, and strain. No heat ought to be applied, else the syrup assumes a milky appearance.

The syrup thus prepared contains between 2 and 3 grains of dry phosphate of lime in each fl ʒ, besides the lactic acid.

BROADWAY, 1183, New York.

—*American Journal of Pharmacy.*

## ON THE PREPARATION OF CHROMIC CHLORIDE.

BY C. WIDEMAN.

The preparation of chromic chlorides, according to the method generally indicated in books of chemistry, is long and tedious. The oxide of chromium must be intimately mixed with charcoal, rolled in small balls, and calcined in close crucibles, etc., before submitting the whole to dry chlorine gas. All these manipulations may be shortened in the following way:

1st. In using a very pure oxide of chromium, and in placing in the flow of the dry chlorine gas, a small vial containing sulphide of carbon or chloroform, so as to allow the chlorine to be entirely saturated by the vapors of this sulphide or chloroform before it reaches the oxide of chromium heated to redness. In using the sulphide of carbon, the following reaction takes place according to the formula:

$$Cr^2O^3+3CS^2+Cl^2=Cr^2Cl^6+3CO+S^6$$

As may be seen, oxide of carbon mixed with sulphurous vapors is disengaged as the sulphur distils only at a high temperature, and can remain with the chromic chloride; it is also necessary, towards the end of the operation to remove the vial containing the sulphide of carbon, and to allow an excess of chlorine to pass over the treated oxide, a more volatile chloride of sulphur is thus formed, from which the chromic obtained is freed; in allowing an excess of chlorine saturated with sulphide of carbon to pass, chloride of carbon is formed as well as a chloride of sulphur. In using chloroform, the oxide of chromium is transformed into a chromic chloride, oxide of carbon is formed, as well as hydrochloric gas and some free chlorine.

Theory indicates that chloroform alone reacting on the oxyde of chromium can yield the chromic chloride, as may be seen by the formula: $Cr^2O^3+3CHCl^3=Cr^2Cl^6+3CO+3HCl$. It is undoubted that with an excess of chlorine, the oxide of carbon can combine with this chlorine to form chloroxycarbonic gas $COCl^2$.—*Jour. Applied Chemistry.*

## PREPARATION OF CHLORATE OF BARIUM.

BY C. WIDEMANN.

Heat for half an hour in a water bath the following mixtures:

One molecule of crystallized commercial sulphate alumina $Al^2(SO^4)^3+18\ H^2O$.

One molecule sulphuric acid.

Two molecules chlorate of potassa.

The whole dissolved into a thin paste by the addition of a sufficient quantity of distilled water. The following reaction takes place:

$Al^2(So^4)^3+H^2SO^4+2KClO^3=Al^2(So^4)^3K^2SO^4+2HClO^3$, or alum and chloric acid.

After cooling the alum crystallizes. To the cold mass add three or four times its volume of alcohol, then filter and neutralize the filtered liquor by the addition of baryta water, thus forming chlorate and sulphate of barium, also separating a little alumina; the largest amount of alcohol is expelled; the liquor is then refiltered to separate the chlorate in solution and then the filtered liquid is evaporated to crystallization.

It is necessary, in order to obtain a very pure chlorate, that the sulphate of alumina and the sulphuric acid be used a little in excess.—*Jour. Applied Chemistry.*

## DETECTION OF TURMERIC IN POWDERED RHUBARB AND YELLOW MUSTARD.

BY J. M. MAISCH.

Rhubarb root which has been attacked by insects, or deteriorated in consequence of dampness and heat, is by some dealers sent to the mills and ground together with some sound rhubarb, or, if the color is not sufficiently bright, turmeric is added, and the powdered rhubarb finds its way afterwards into the hands of the unsuspicious as a prime article. The fraud may be detected in a few minutes in the following manner:

A small quantity of the suspected rhubarb is agitated for a minute or two with strong alcohol, and then filtered. Chrysophanic acid being sparingly soluble in this menstruum, the brown yellow color of the filtrate is due to the resinous principles of rhubarb mainly; if adulterated with turmeric, the tincture will be of a brighter yellow shade. A strong solution of borax produces in both tinctures a deep red brown color. If now pure muriatic acid be added in large excess, the tincture of pure rhubarb will instantly assume a light yellow color, while the tincture of the adulterated powder will change merely to a lighter shade of brown red. The test is a very delicate one, and is based on the liberation of boracic acid, which imparts to curcumin a color similar to that produced by alkalies, while all the soluble principles of rhubarb yield pale yellow solutions in acid liquids.

The same test, applied in the same manner, is also applicable to ground mustard seed. The seeds of *Sinapis alba* yield a powder of a yellow gray color, entirely distinct from the color of yellow mustard met with in the market. Agitated with alcohol and filtered, a turbid solution is obtained, which assumes a bright yellow on the addition of the borax solution, and becomes colorless or whitish again on being supersaturated with muriatic acid. If the mustard be colored with turmeric, the filtrate has a yellow tint, becomes brown red with borax, and retains the color on the addition of muriatic acid. All the so-called yellow mustard of our commerce which I have had occasion to examine, whether ground in England or in the United States, contains turmeric. This practice ought to be discountenanced; for, under the yellow color imparted by curcuma, adulteration of mustard may be carried on to an almost indefinite extent, if *strength* be supplied by the addition of a little capsicum.—*Amer. Journal of Pharmacy.*

## ON FERMENTATION.

BY PROFESSOR A. W. WILLIAMSON, F.R.S.

*Before the Society of Arts. Reprinted from the Pharmaceutical Journal, London.*

### LECTURE II—CONCLUDED.

There is one other remarkable instance which I must give you, to show the difficulty in some cases of analysing these phenomena. It is the case of the metal platinum, which I can hardly describe better in general terms, as regards its properties, than by comparing it to gold. It is what is termed a noble metal; it does not dissolve in any ordinary acid; you might boil platinum in nitric acid for any length of time and it would not dissolve. On the other hand, silver is a metal which dissolves readily in this acid, and if you melt silver and put platinum into it, it will also melt, and you obtain a compound of the two metals mixed pretty uniformly together. It was noticed that when such a button of platinum and silver is put into nitric acid, not only does the silver itself dissolve, as you would expect, but some of the platinum also dissolves with it; not the whole, but a portion. That seems, at first sight, favorable to the theory of contagion; it seems natural to suppose that the silver, in dissolving, has communicated the same tendency to the platinum, and made some of it dissolve. But that explanation will not do, and for this reason. When platinum is combined with anything else, I care not what, its properties are not the same as when uncombined. The very essence of chemical combination is that the particles which are in intimate contact unite, and that the compound possesses different properties from the original elements. We know that metals combine with one another; there are many cases known to us of the forcible union of metals, and we have no right to suppose in any case, unless we have actual proof of it, that a metal is present in such a compound with its ordinary properties. Therefore, it is not free platinum, but a compound of platinum and silver which dissolves, and there are some compounds of platinum which dissolve in water, and others which dissolve in nitric acid, so that this process has really nothing to do with contagious action.

In the composition of alcoholic ferments there are several substances of which we know very little at present, I am sorry to say, but the want of this knowledge is so great that I have no doubt it will be soon supplied; certainly, this is a most important field for the investigation of naturalists who possess an accurate knowledge of chemical manipulation. I mean the simplest and lowest organisms, whose functions are of such importance in these changes, and certainly claim much careful investigation. But some of the things which we do know about the yeast-cells, I must now state, with relation to the facts and ideas which we have just had before us. In the first place, with regard to their growth.. It is very common, in the process of brewing, to feed the yeast-cells with a substance which is formed in the germination of barley. When barley is left in a moist state, at a suitable temperature it begins to sprout, and during that process there is a change in two of its constituents, which I showed you the other day. One is gluten, a body containing nitrogen, which I compared, for the sake of convenience, to muscular fibre, being in reality very closely allied thereto in chemical composition, and during the germination of the seed this substance passes over into some product or products—I had better speak quite generally—known by the name of diastase. In the yeast-cells there is a substance very nearly resembling in composition this gluten, and it cannot be doubted that this gluten, or albuminous body as it is frequently called, is capable of undergoing a similar transformation into diastase, and of all foods the yeast-cell enjoys most those which contain diastase. I have a good many yeast-cells growing in a suitably heated chamber, and those which seem to thrive most are some which were put into an infusion of malt to which sugar was added. It is common, in the process of fermentation, to put in yeast in tolerable quantity, but the extent to which it grows depends upon the time for which it is left in contact in the material. I am told that the common proportion is about one-twentieth of the quantity of yeast required. For instance, if 20 ℔s. of yeast are wanted to effect a given fermentation, you put into the liquid which has been fermented 1 ℔. of yeast calculated in the dry state, and give it this diastase to feed upon. At the same time, there is sugar present in the liquid, and during the process of fermentation this pound weight of yeast increases more and more, by a process of true germination and growth. Professor Mitscherlich actually saw, under the microscope, some little cells of yeast sprout and put out, from the side of the parent cell, small cells, which gradually increased in size. The actual process, however, has not been seen by many observers. And not only does the yeast-cell in that way feed upon these albuminous bodies, which are grouped together by the name of diastase, but it also takes part of the sugar; and these are the two prominent facts which we know with regard to its food—that it feeds upon substances of those two classes; sugar, which contains no nitrogen, and also nitrogenous substances, which are formed by the partial breaking up of the gluten. On the other hand, its decomposition—I mean during its life; I am not speaking of any decomposition which its materials may undergo if it is killed—gives off alcohol, carbonic acid, succinic acid and glycerine; in fact, the four chief products of ordinary alcoholic fermentation, which I enumerated to you the other day. And while these products are being given off, there is at the same time a considerable quantity of nitrogenous substances being given off. The albuminous matter in the yeast-cells is undergoing decomposition, and is giving off nitrogenous substances. There is not any well-authenticated case of the yeast-cell forming, during its active functions, products of complete breaking up or putrefactive decomposition; all the products which we know best are substances of considerable complexity—less complexity than the materials of the plant, but of great complexity; and, accordingly, the notion which Liebig had that the yeast-cell is active in the proportion as its materials are undergoing complete analyses or breakings up, and forming ammonia and carbonic acid, is not now entertained by that distinguished philosopher.

Some time ago, an exceedingly important experiment was made by M. Pasteur, with a view of testing the vital functions of the yeast-cells in a definite way. The statements which I have made to you contain a good many terms which are exceedingly general, as, for instance, the allusions to diastase. We really do not know what that is. We know about what sort of a thing it is made from, but not definitely. And the same with the nitrogenous products which are given off by the yeast-cells; we know something about them, but only a little. Pasteur put into a solution of sugar, in which some yeast particles were present, some ammonia combined with an acid, and at the same time he put some of the ashes of other yeast-cells. He took a certain quantity of yeast and burnt it, so as to remove by oxidation the carbon, hydrogen and nitrogen of the substance, and the earth substances which remained, which are essential to the formation of a new yeast-cell, he put in some fermenting liquid, together with some salt of ammonia. When he did that, he really was treating the yeast-cells very much in the same way as a good farmer treats the wheat plant. If you want a wheat plant to increase rapidly, you must, in the first place, take care to supply to it all that the wheat plant takes up in the shape of mineral matter from the soil, and the best way to find that out is to burn some wheat, and see what is left. Then you must supply plenty of ammonia, and the more ammonia you supply up to a certain extent, the more rapidly does the wheat grow, by building up various simple substances into the complex substance, gluten, which I was speaking of just now. Pasteur put into such a mixture a few little cells of the yeast, and they did not thrive. They did transform some sugar into alcohol and carbonic acid, but they evidently were not at home, and at the end of a certain time, I forget how long, he found there was actually a smaller weight of yeast present than he had put in. That was a very different result from what happens when nitrogen is supplied to the yeast-plant in the form which I mentioned just now as the usual one; and I think the fact is most instructive, and serves to show us what kind of a being the yeast-cell really is,—I mean whether it should be classed among animal or vegetable beings. I need hardly say that absolute distinctions amongst beings which we find in nature are out of the question; we do not generally get any absolute line of demarcation, for one class flows over into the other; but still the ideas which serve us to classify organic and other beings are exceedingly important, and in a case like this it is certainly of considerable interest to have some leading idea, by which one may see whether there is a reason for placing these beings amongst vegetable or animal organisms, and we cannot help giving special weight in that respect to the kind of process which the respective classes of beings carry out in their organisms. Plants build up complex substances from simple. All the most complex substances that we can get are made in the organisms of plants. They may have been taken over by animals from plants, but they are formed in the main by plants. And the chief chemical activity of animals is precisely opposite; they take those complex substances, and break them down, by means of their vital functions, to the simple products which are exhaled and given off in the processes of animal life. Therefore, the question whether the process which the yeast carries on is a synthetical process, is certainly one of the most important which can guide us. Now, I think what I have said must appear to you all most conclusive in that respect,—that what we know best regarding the nature of the yeast-cells, the food which we know they take in large quantities, and upon which they live, is certainly exceedingly complex, and what the yeast-cells take up in preference is certainly sugar, and the very complex nitrogenous substances which are present in solution in the malt, and the products which they give off, are exceedingly simple in comparison. Their functions are in the main (those which we know best, at any rate) analogous to those which take place in animal organisms, and are most remote from those which take place in vegetable organisms.

In a paper which he has recently written on the subject of fermentation, Liebig has drawn attention, amongst other things, to the circumstance that the common alcoholic ferment can be made to eat tartaric acid. If you were to neutralize a solution of some of these crystals in water, and put with the solution some yeast-cells, at the same time supplying some nitrogenous material, the yeast-plants would grow, and transform that into other substances. In the same way, if you were to put in some of this malic acid (which got its name from the circumstance that it is present in sour apples), the yeast-cells would also transform that; and the same in other cases. One of the most remarkable decompositions is that of nitric acid, which, by the action of the yeast-cells, is deprived of some of its oxygen, and converted into nitrous acid, so that it would appear that the plant can actually assimilate or eat the nitrates, forming these simpler derivatives from them.

There is one case which I should like to show you, of an inorganic action, one in which there is no vital process concerned, but it bears a sort of general resemblance to what I conceive to be the principle of those which I have been speaking of. I have here a piece of platinum in a peculiar state, which is well described by the term "spongy." If I hold it in the flame of common coal-gas mixed with air, from a Bunsen burner, the spongy platinum eats the air or the oxygen contained in it and the gas. The word "eat" is not really so inappropriate as it may seem. If I were to put this spongy platinum into oxygen, I should find that it would combine a quantity of oxygen into its substance, and make it part of itself, and the same with regard to the coal-gas. So that here you see, from the heat which was given off, the substance is really effecting a chemical change upon the materials which it absorbs, and it effects that change in its own substance. It is admitted that, in some way or other, the yeast organisms—I will not again call them plants—actually assimilate and make part of themselves the sugar, or tartaric acid, or whatever it may be which they decompose; but they do not give off that substance which they have eaten in the same form. They give off its elements, after they have undergone a rearrangement in other ways. At our next meeting I propose to bring before you some different considerations regarding the vital functions of these organisms, and some points which bear upon questions of sanitary importance.

(*To be continued.*)

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# EDITORIAL.

## MONSTROSITIES—AN APPEAL FOR THE ARREST OF THEIR DEVELOPMENT AMONG THE PEOPLE.

The daily press are just now heralding a remarkable *lusus naturæ*. In Ohio, we believe, some six months since, were born two children joined together in a right line at the pelvis. Already photographs of these children are offered for sale, and the parents are even now reaping a profit from the exhibition of their miserable offspring.

Our object in noticing this freak of nature is to enter an earnest protest against the *exhibition* of such monstrosities. It is the duty of the State to protect women against such spectacles. It is a fact, not questioned, we think, by a single physiologist of the day, that impressions upon the mind of the mother are capable of affecting injuriously the fœtus. This fact is as old as the Bible, and the number of well authenticated cases which might be collated to illustrate it is very large.

The relation of cause and effect between a mental impression, and change in the fœtus being admitted, the protection from the cause, of those liable to detriment from it, is plainly a matter of duty.

In reference to many other causes from which mankind may receive hurt, the avoidance of them is left, after due warning, to the judgment of the person exposed.

In the matter of injury to offspring from impressions made on the mind of the mother the case is far different, inasmuch as the very warning of danger tends to enhance the liability to accident. It is wise, therefore, on the one hand, to conceal the fact of susceptibility to evil results from the susceptible; and on the other, to remove as far as practicable, causes exciting to injury.

Evidently it is the duty of legislators to shield the child-bearing women of the State from recognized cause of injury to their offspring, by the enactment of laws prohibiting the exhibition of monstrosities. Such laws have long existed in some of the governments of Europe, and the are from year to year more and more imperatively demanded in this country.

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Book Notices.—"The Causation, Course and Treatment of Reflex Insanity in Women. By Horatio Robinson Storer, M.D., LL.B., of Boston. Lee & Shepard, Boston, and Lee, Shepard & Dillingham, New York: 1871."

This treatise of Dr. Storer was communicated to the American Medical Association in 1865, and is now published in book form.

Dr. Storer labors to show that the statement of Morel, "That the brain is always the seat of insanity, *but it is not always* the seat of its *cause*," has been too little heeded in the treatment of insanity in women. He alleges that in a very large proportion of the cases of insanity occurring in the female, her sex is the predisposing, exciting, or continuing cause. The writer claims that the treatment in such cases should be of a direct and physical character. Dr. Storer supports his proposition and statements with abundant proofs. The impression of the medical reader is that the work of the doctor in sustaining his positions is one of supererogation—that the facts so much dwelt upon are universally acknowledged by the profession.

It will become apparent, however, as the reviewer proceeds, that there is much reason in the doctor's elaborate method of putting the facts before his readers. For it is quite conclusively shown that whatever may be the theory among medical men as to the cansative relation of diseases of the sexual organs of females to insanity, the *practice* in regard to such cases is very often not in accordance with such ideas, but is, in fact, frequently only an idle and *quasi* ignorant expectancy.

In reference to the promise of great progress in the study of diseased cerebral conditions given by the recent microscopical researches of Dr. Clark, and others, the work is silent.

We commend this very useful book to the careful perusal of all commissioners of insane asylums, to the end that the pertinent question suggested by it may occur to them, to-wit: Is our asylum simply a "first class prison," or is it an institution where all means, methods and appliances known to the profession are made use of to effect the CURE of the most unfortunate inmates?

"The Health and Wealth of the City of Wheeling. By James E. Reeve, M.D."

This pamphlet of 150 pages is a report of the Health Officer of the city of Wheeling, in reference to its topography, climate, sewerage, modes of ventilation, water supply, system of sinks, nuisances, food, drink, diseases, birth and death record, &c. It is full of facts in relation to these matters, and contains valuable suggestions on a number of other topics of interest to all engaged in the study of hygiene. As a Health Officer's Report it is a great advance on a majority of similar productions. The chapter on earth closets, fully illustrated, is the best treatise on that subject that we have seen. The book will commend itself to all having an interest in the matter of which it treats.

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## NINETEENTH ANNUAL MEETING OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

Notice—American Pharmaceutical Association.—The Nineteenth Annual Meeting of the American Pharmaceutical Association will be held in the city of Saint Louis, Missouri, on the second Tuesday (12th) of September, 1871, commencing at 3 o'clock P.M.

With the view of increasing the interest and importance of this meeting, the Committee of Local Arrangements will endeavor to make the display of products in any way connected with the drug business as extensive as possible.

Specimens of crude drugs, especially such as are indigenous to the West and South, will serve to illustrate the Materia Medica of the great Valley of the Mississippi, and are particularly desirable. Articles for exhibition should be delivered free of expense, to Wm. H. Crawford, Local Secretary, Saint Louis, accompanied by an invoice and description,

It is earnestly hoped that all who are eligible, and who are not already members, will become such, and thus more nearly equalize the representative number of members among all the States, which would greatly increase the usefulness of the Association, and render it more national in character.

R. H. Stabler, M.D., *President.*

Alexandria, Va., June 13th, 1871.

St. Louis, Mo., May 25th, 1871.

The Nineteenth Annual Meeting of the American Pharmaceutical Association will be held on Tuesday, the 12th day of September, 1871, at St. Louis.

For the first time in the history of this Association, its Annual Meeting will be held West of the Mississippi river, and for this reason it is the desire of its members in this city, to make this meeting as attractive, entertaining and successful as any previous one. As the representative city of the Great West, and its easy access from all parts of the Union, it is hoped that all members of the Association, together with the Colleges of Pharmacy, and all Druggists throughout the United States, will attend.

The importance of the Association for the diffusion of valuable knowledge through its discussions; its influence in establishing reform, and in abrogating unjust taxation in existing laws; its advancement of Pharmacy, and its high character as a scientific body, are too well known and too highly appreciated by its members, and by Pharmacists throughout the United States, to require commendatory notice.

With the view to make this meeting interesting and attractive, beyond the deliberations of the Association, and to open sources of information to the trade at large, relating to all productions, such as chemicals, pharmaceutical preparations, new remedies, drugs, instruments, apparatus, glassware, shop furniture, and every variety of articles pertaining to the drug business, it will be the endeavor of the committee of local arrangements to make the display of such products among the most attractive hitherto made.

Specimens of crude drugs, especially such as are indigenous to the West and South, would in a particular manner illustrate the Materia Medica of the great Valley of the Mississippi.

In order to give every member an opportunity to attend the Exhibition, it is suggested to set apart the afternoon of Wednesday, the second day of the meeting, for this purpose,

Articles for exhibition should be delivered free of expense, to the undersigned, accompanied by an invoice or description. All articles will be returned or sold, or may be donated to the St. Louis College of Pharmacy, as the exhibitor may elect.

Applications for space should be made early, so that ample room may be reservsd. Very respectfully,

Wm. H. Crawford,
Local Secretary, American Pharmaceutical Association.

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Notice.—Those of our readers who find bills attached to this issue, or who are aware of indebtedness, are requested to remit to us without delay. Though the sum from each is small, the aggregate amount is considerable and of much moment to our journal. Our readers can greatly aid us, if they will, in increasing our circulation. A slight personal effort would make many additions to our list of subscribers.

Back numbers and volumes can be supplied at the regular subscription price.

# THE PHARMACIST

AND

CHEMICAL RECORD.

VOL. IV. CHICAGO, AUGUST, 1871. No. 8.

## PHOSPHATES.

BY R. ROTHER

Phosphoric acid and its salts have long established their unprecedented claims as valuable medicines. But the particular basicity of the acid, and condition of the metal, are subjects of the highest consideration where the utmost available effect is desired from the combination. The normal state of phosphoric acid is the trihydric or orthophosphoric acid, and it must invariably pass into this modification before it is assimilated in the organism. Hence, the rule should be observed that where phosphoric acid, either free or in combination, is taken into the system, it ought always to be administered in its tribasic state. The same also applies to the metallic element in question. This should be in its normal form of oxidation, as otherwise the organic forces must be expended to first bring it into an assimilable condition. The normal state of the indispensable element iron is the ferric, sequioxide or tetrad form, and this fact is medicinally attested by the invaluable trichloride. To obtain the full effect from such a medicinal agent it should be in permanent solution, and therefore the best possible shape in which to administer iron and phosphoric acid is as ferric orthophosphate in an acidulated solution.

The monobasic or metaphosphoric acid ($PO_3H$) is an officinal substance. But medicinally this modification is rarely used. It was chiefly introduced as a ready means of producing the normal acid, or officinally diluted phosphoric acid, as an offset to the tedious and troublesome process of oxidizing phosphorus with nitric acid. The monobasic as well as the tetrabasic or pyrophosphoric acid ($P_2O_7H_4$) are converted into the tribasic modification by the action of boiling water. But to facilitate the transition a small quantity of some other acid is usually introduced; officinally, nitric acid is employed for this purpose, but the writer believes that the officinal quantity is at least four times greater than necessary, likewise the amount of water may be advantageously reduced to two or three times the weight of the glacial acid first used. The necessity for this change is more particularly observed when a quantity considerably larger than the officinal is operated with. The writer also considers that chlorhydric acid would be better than the nitric, as the diluted phosphoric acid, when prepared from metaphosphoric acid by the catalytic action of nitric acid, invariably deposits voluminous flakes of a mould-like substance, probably resulting from the mutual decomposition of the nitric acid and organic impurities of the water. It would be very advisable if a concentrated or syrupy tribasic phosphoric acid, containing either half an ounce of metaphosphoric or orthophosphoric acid in the fluid ounce were made officinal. In the writer's experience, this is an exceedingly convenient preparation. It dispenses with large quantities of the inconveniently bulky diluted acid, is always ready for preparing this, and can be advantageously employed in this form for many other uses.

The officinal Ferri Phosphas is a preparation of doubtful utility. Its composition is never constant. It is but very rarely prescribed, and, owing to its indefinite composition and adverse character cannot be utilized in making any of the iron preparations. It should therefore be expunged from the officinal list.

All ferrous salts with the bromide and iodide perhaps medicinally, and the sulphate pharmaceutically excepted, are medicinally as well as pharmaceutically objectionable preparations. The assumed medicinal superiority of ferrous salts is all imaginary. Their proper influence is not exerted until they have suffered an entire change by passing into the tetrad form. It is but a morbid craving for scientific novelties on the part of pharmaceutists as well as physicians that perpetuates the demand for the unstable and often therapeutically objectionable protosalts of iron.

The popularity of ferric salts, however, has gained the ascendent; this is mainly due to their constancy, permanence, and the readiness with which a much greater variety can be produced; but no small share of credit belongs to their very apparent medicinal quality. The ferric orthophosphate is destined to rival the justly celebrated ferric trichloride. All ferrous salts possess the unpleasant ferruginous flavor in a high degree. But many ferric salts are entirely destitute of it. This is a great advantage in their administration, and this peculiarity attaches mainly to ferric phosphates. Ferric phosphate ($PO_4Fe'''2OH_2$) when precipitated from a solution of ferric sulphate by an excess of disodic phosphate is a bulky amorphous precipitate of a cream color. It retains this color when dry. It dissolves but sparingly, if at all, in phosphoric acid, very readily in dilute sulphuric or chlohydric acid, and is extremely soluble in normal ammonium citrate.

When ferric orthophosphate is obtained by double decomposition between ferric sulphate and disodic orthophosphate, the reaction may be assumed to take place as is indicated in the following equations:

$(SO_4)_3Fe_2''' + 2(PO_4Na_2H.12OH_2) = 2(PO_4Fe'''2OH_2) + 2(SO_4Na_2) + SO_4H_2 + 20OH_2.$

$(SO_4)_3Fe'''_2 + 3(PO_4Na_2H.12OH_2) = 2(PO_4Fe'''2OH_2) + 3(SO_4Na_2) + PO_4H_3 + 32OH_2.$

But practice demonstrates that the decomposition proceeds according to the second equation, where one-half more disodic phosphate is required to precipitate the iron completely; in this case, as will be seen, free phosphoric results, in which the precipitate is insoluble, whilst in the first case sulphuric acid is set free, which retains its equivalent of ferric phosphate in solution, therefore, an excess of disodic phosphate is required to insure free phosphoric acid only. The inestimable importance of ferric orthophosphate rests in its solubility in chlorhydric acid, and ammonium citrate, and the nonmetallic flavor and permanence of the resulting compounds.

The fact of the solubility of ferric phosphate in ammonium citrate was as early known as that of the ferric pyrophosphate, and it is surprisingly remarkable that thus far no practical advantage has been derived from the observation. The difficult and in every way inferior citroferric pyrophosphate has alone been known, whilst the citroferric orthophosphate is equally tasteless, more permanent, and much more soluble, requires only two-thirds as much ammonium citrate for solution, and consequently stronger in iron, and is, above all, more in therapeutic accord with the organism. Therefore, in a spirit of justice towards both professions, the officinal pyrophosphate of iron should be discarded, and the more eligible citroferric phosphate adopted.

It is certain beyond question that the solution of ferric orthophosphate in chlorhydric acid will in time outrank many of the most esteemed iron and phosphoric acid compounds now in use. Firstly, its pleasant acidity and absence of metallic flavor will render it medicinally popular; and, secondly, its permanence, constancy of composition, and ease with which it can be produced and combined with various other agents usually associated with similar iron compounds will give it pharmaceutical recognition.

Sixteen grains of dry ferric orthophosphate forms a perfect and permanent solution with one fluid drachm of officinal diluted chlorhydric acid. This solution can be diluted with water to a half or one fluid ounce. One teaspoonful of the latter dilution would then contain two grains of ferric phosphate, and be sufficiently dilute and pleasant for administration. A solution of this strength, with an addition of 15 minims of diluted chlorhydric acid to each fluid ounce will produce an elegant combination with eight grains of quinic sulphate and one-fourth grain of strychnia. This solution can be modified to an iron and quinia mixture by omitting the strychnia, or to an iron and strychnia preparation by leaving out the quinia and the extra 15 minims of diluted chlorhydric acid. These solutions of ferric phosphate are all colorless, and the quinia combination is even not fluorescent, and not at all unpleasantly bitter. Sugar is superfluous if not objectionable in these preparations. The bitterness of quinia and strychnia is not relieved by it, but rather prolonged and increased by reason of its adhesiveness.

The writer hopes that the preparations above suggested will replace perforce of merit the numerous apparently similar preparations of the market, against which so many objections can be urged. The writer has endeavored to secure the greatest possible simplicity in the operations compatible with the requirements of the preparations. The starting point for all begins with the ferric orthophosphate, whose process follows below, together with that of the other preparations in their order.

*Ferric Orthophosphate.*—For pharmaceutical uses this preparation can be employed in two ways, namely, in the moist and the dry condition. Hence the substance should also be kept on hand in the latter state. When it is to be used moist the quantity is calculated from its equivalent of ferrous sulphate, of which it is approximately two-thirds, or a yield of 2560 grains from the following process:

Take of ferrous sulphate, in coarse powder, 8 troy ounces.
Sulphuric acid, one troy ounce and 200 grains.
Potassium chlorate, in crystals, 282.47 grains.
Disodic orthophosphate, 17½ troy ounces.
Water, sufficient.

Mix the sulphuric acid with one pint of water, add the ferrous sulphate and apply heat until complete solution results, then add the potassium chlorate, stir until dissolved, discontinue the heat, add water to the measure of two pints and filter. Dissolve the sodium phosphate in four pints of water with heat, filter and add water through the filter to the measure of six pints. Now pour into this the solution of ferric sulphate, with constant stirring, and place the magma on two filters supported on two pint funnels respectively, wash the precipitate with cold water, stirring it up occasionally, until the washings are tasteless. Wrap the moist precipitate in bibulous paper to absorb the superabundant liquid, then spread it out in a shallow dish and dry it by a moderate sand bath heat.

*Ferric Citrophosphate, or Citro-ammonium Ferric Phosphate.*

Take the washed moist magma of the preceding process.
Citric acid, 3 troy ounces and 30 grains.
Water of ammonia 8⅜ fluid ounces, or sufficient.

Add the water of ammonia gradually to the citric acid in crystals until this is exactly neutralized or but very slightly acid, then gradually add the moist precipitate and apply a gentle heat until the magma has completely dissolved. Filter the solution and evaporate it till a pellicle begins to form, then spread the liquid on glass or porcelain plates and dry with a moderate sand bath heat. A concentrated solution of this preparation, similar to the officinal solution of ferric citrate would be very desirable, but a simply aqueous solution rapidly deteriorates. However, the writer has found a solution containing half an ounce of the salt in a fluid ounce of a solution containing enough sugar to form a thick syrup (about six ounces in the pint) to be perfectly stable. Yet the solution of the citrophosphate must first be evaporated to its utmost concentration before the sugar is added, and this dissolved by a very gentle heat, otherwise the fine green solution assumes a deeper color of a brownish cast. But perhaps glycerin would be a more convenient preservative.

*Solution of Ferric Phosphate.*

Take the washed moist magma of the first process above.

Chlorhydric acid, 5 troy ounces.
Water, sufficient.

Dilute the chlorhydric acid with one pint of water, add the precipitate, agitate until dissolved, filter and add sufficient water to make the solution measure 10 pints and mix.

*Solution of Ferric Phosphate and Strychnia.*

Take the preceding solution.

Strychnia, 40 grains.

Dissolve the strychnia in a part of the solution with heat and mix the whole again thoroughly together.

*Solution of Ferric Phosphate and Quinia.*

Take the washed moist magma of the first process.

Quinic sulphate, 2 troy ounces and 320 grains.
Chlorhydric acid, 5¼ troy ounces.
Water sufficient.

Dilute the acid with one pint of water, gradually add the magma and agitate until this has dissolved, then add the quinic sulphate, and when that has dissolved filter the solution and pour water through the filter till the liquid measures 10 pints and mix. If the sulphuric acid in this preparation is objected to, the quinia can be introduced as chloride. This is effected by double decomposition between quinic sulphate and calcium chloride, and the process would be modified by the following addition:

Take of calcium chloride, fused, 163 grains.

Dissolve the quinic sulphate in 1¼ troy ounces of the chlorhydric acid previously mixed with 8 fluid ounces of water. Dissolve the calcium chloride in one fluid ounce of water, and pour this into the first solution, let repose a short time, pour the whole on a filter and wash with water until the filtrate is not perceptibly bitter, add this to the iron solution prepared as above, and add water to the measure of 10 pints.

*Solution of Ferric Phosphate and Quinia with Strychnia.*

Take either of the preceding solutions of iron and quinia and add 40 grains of strychnia as above directed.

## SYRUPUS SCILLÆ CO.

BY DR. A. S. V. MANSFELDE.

The simplicity of manipulations necessary for the preparation of most of the articles found in the United States Pharmacopœia is justly praised by most compounders, especially those who take care to meet all the requirements so indispensable to the success of the medicinal agent. Nevertheless, we will find directions which are worthless, not only as regards the identity of the results, but also from the expense incurred by faithfully observing them. Hive syrup for this time shall bear witness to the above assertions. The formula for the same is:

Take 4 ozs. each of senega and squill roots; prepare them for percolation, in which operation use 1½ pints of alcohol, and so much water. Boil the percolate and evaporate the same, then add boiling water, next add the sugar; boil and strain, and lastly dissolve the tartar emetic in the hot syrup.

In the preparation of any medicinal article we have to observe two points: First, we must know what of the crude drug is the medicinal principle; and secondly, how we may extract the latter. And I would add another point, not the less worthy of consideration. The mode of extraction should be the one that involves the least expense, at the same time insuring the best product. In the preparation in question, we find two active principles—that of senega, senegin (acidum polygalicum, Quevenne), and of squills, scillitin (Vogel). Either of these is soluble in water. The senegin is completely extracted by this solvent at a boiling point; also by alcohol, but more so in the warm than in a cold condition. The scillitin, it is asserted, and I think with some degree of certainty, is not affected at all by alcohol, as long as a layer of gum incloses the same, and this can only be removed by water, and the gum being dissolved, the scillitin will dissolve in the water as well as in the same quantity of dilute alcohol. Common vinegar dissolves the active principle of squills readily, but cannot be used as a menstruum in this preparation, because it precipitates senegin of the snake root.

What are the results of the directions given by the United States Pharmacopœia? The dilute alcohol extracts the active principle of either drug; at the same time it is accompanied by certain oily acids and resinous extracts, altogether indifferent, as regards the medicinal value of the drug. Nevertheless, we have them added through the alcohol to the menstruum. So far so good; but, continuing the work, we are asked to evaporate our percolate and filter it. By this process, as every one will admit, all the alcohol is lost, and the matter formerly dissolved at the same time precipitates and remains on the filter, exemplifying how slow a fluid will pass through the almost closed pores of filtering paper. It is a fact that hot water will extract scillitin and senegin from the respective roots far easier than alcohol. Why, then, use the latter, when nothing is gained at an increase of price and labor?

I have used the following formula, and recommend it to the profession:

Rad. Scillæ.
Rad. Senegæ, a.a. ℥ iv.
Alcoholis, ℥ iv.
Aquæ fontanæ, O iii.
Sacchari alb. ℥ xlii.
Antimonii et potass. tart. grs. xlviii.

Boil the squills and the senega slowly till 1½ pints expressed decoct. remain; to this add 4 ozs. of alcohol and filter; to the filtrate add the sugar, and prepare the syrup by gentle heat; lastly add the tartar emetic. The alcohol in the preparation precipitates all the gummy substances dissolved in the decoction, and albuminous matter is not present, as the boiling water coagulates the same. Is it necessary to point out the difference in price and labor to the experienced pharmacist?

The same remarks are valid in regard to syrupus senegæ, and the above formula answers as well for this preparation.

CHICAGO, June 13, 1871.

# THE PREPARATION OF THEINE.

BY CHAS. FREDIGKE.

In the *Medical Times and Gazette* Mr. Lewis Thompson publishes an article entitled, "Use of Theine as a Therapeutical Agent," reprinted in the *Druggists' Circular* for June, page 96, in which he described a convenient method for the preparation of this agent; but the writer found the hollow and movable axis of the rotary coffee-roaster rather awkward, besides its length of three feet much too short to insure the deposition of all the crystallizable particles of the vapor given out by two pounds of coffee. The complete utilization of that amount of vapor would require a tube (being one inch in diameter) nine to twelve feet in length, and even longer. To obviate these disadvantages, recourse was had to a little stationary arrangement. It consists in a Linden's patent coffee-roaster, a thin cast iron pot, whose contents may be turned over by a perforated and toothed shovel. To the cover a tube of two inches in diameter was fitted, the whole length of which is three feet, made in three sections, for convenient removal and cleaning. Put on a stove and heat the pot to between 300° and 400°, then turn in the coffee, fit on the cover and pipe, passing the free end of the latter through a card board into a gallon bottle, then raise and continue the heat for 15 or 20 minutes, during which time the crank must be turned, and the cover now and then raised to examine the color of the beans, though this is not necessary after two or three repetitions of the process, when the cover may be luted on by a cement made with a little water out of two parts of linseed meal and one part plaster of Paris; besides, with a brisk fire the operation of roasting requires but ten minutes, when the coffee will have assumed the right shade of color. During the process the tube and the bottle grow rather hot, and it is advantageous to cool them by wet rags, but it is not absolutely necessary. The aqueous portion of the vapor condenses in the bottle to the amount of two ounces, and upon removal of the cover and tube, they will be found coated with a thin film, which is washed off by eight ounces distilled water, with which the bottle is also well rinsed; then the liquid is filtered and evaporated over a water bath to two ounces; to these, two ounces of dried carbonate of potassa is added (very easily made by exsiccating 2¼ ounces of salt of tartar in an iron ladle [fitted with a cover], one of three inches diameter by one inch depth is large enough, or a Hessian crucible will answer very well), the mixture set aside over night to allow the precipitate of theine to form. If the alkaline solution is very concentrated the precipitate will collect on the surface, but on adding a little water it will subside, the supernatant liquid is then decanted, the deposit redissolved in distilled water, evaporated over a water bath to dryness, and finally crystallized from a boiling solution in alcohol, which is distilled off and allowed to evaporate.

Theine obtained in this way is sufficiently pure for medicinal use. Two pounds of Rio coffee yielded 104 grains. It seems strange that the decided therapeutic value of this agent has thus far failed to bring it into more general use by the profession.

The above arrangement is not expensive, costing two dollars and a half, and is also useful for some similar purposes, such as the preparation of baccæ juniperi tostae, et glandes quercus tostae, etc., in fact for the torrefaction or incineration of many organic substances. A domestic process such as this, of almost weekly occurrence in every family, is thus turned into an interesting and profitable pharmacal operation.

To avoid repetition, the reader is referred for some further points of information on the subject, to the article above mentioned.

CHICAGO, July, 1871.

## THE CHEMICAL NOMENCLATURE OF THE PHARMACOPŒIA—WITH SUGGESTIONS FOR ITS REVISION.*

BY PROFESSOR ATTFIELD.

The chemical nomenclature of the current Pharmacopœias is mainly scientific, founded on theory, and therefore liable to change. Its one great fault, in relation to medicine and pharmacy, is mutability. A fault, and a great fault, because the life and health of people are largely dependent on the perfect understanding which should always subsist between physician and pharmacist respecting names of medicines which the former prescribes and the latter prepares. But it is a fault which cannot altogether be avoided. For a name is seldom given haphazard; it is commonly designed to express our ideas regarding a thing or substance, and as those ideas are developed and extended, our point of view or theory respecting them necessarily changes; the old name is no longer consistent with our knowledge, and must therefore be also changed. Moreover, there is a limit to the power of language, and desirable as may be a system of names for remedial agents which shall be fixed, abiding, permanent, the production of such a system in the present state of knowledge is altogether impossible. What, then, are pharmacists, medical practitioners and others to do when chemical names they have accepted on authority are, by the same authority, modified or abandoned? Within the last few years the views hitherto prevailing of the constitution of matter have undergone radical alteration, being no longer consistent with ascertained truths, and the nomenclature or language embodying those views has, of course, shared the fate of the theories. Under these circumstances, by what principles are we to be guided in adopting for medicine, pharmacy and the Pharmacopœia such names as, on the one hand, shall be perfectly explicit, readily understood, unambigous; and, on the other, consistent, or at least harmonious with prevailing chemical theories as expressed in the educational literature of the science? For not only is it to be remembered that changes must be expected in pharmaceutical names because we have already adopted and employ a nomenclature which, in the nature of things, is liable to change; but we must bear in mind that the successors to men now in practice are learning chemistry by aid of the new hypotheses, and their progress is impeded by old forms of language and by the erroneous notions which that language imparts. This state of things cannot continue; the march of science has ever been aided, never hindered, by medicine and pharmacy. But what position are we to take in respect to this subject? The question is one that demands careful attention. I have endeavored to answer it myself, and now venture to give to others the train of thought I have followed, and the conclusions at which I have arrived.

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* Extracted from the paper of Prof. Attfield, read at the meeting of the Pharmaceutical Society of Great Britain, April 5, 1871.

The system of nomenclature hitherto accepted, and that which is employed in European and American Pharmacopœias, was mainly suggested by Lavoisier, eighty-four years ago. The fundamental principle on which it was founded was, that the name of a salt should express its composition. The great majority of chemical substances employed in pharmacy are such mineral salts as were known to Lavoisier, and their names were mostly given on the assumption that they contained, on the one hand, an undecomposable body, generally a metal, common to a whole class of salts (the compounds of *copper*, for example), and on the other, a body, or a group of elements, also common to a number of salts (*sulphates*, for example). Soda, potash, lime, baryta, magnesia and alumina were then considered to be elements; such names as carbonate of soda, nitrate of potash and sulphate of baryta were perfectly consistent with those of carbonate of iron, nitrate of mercury, sulphate of copper. Green vitriol, blue vitriol, Glauber's salt and gypsum, for example, were considered to contain, on the one hand, the "elements" iron, copper, soda, and lime respectively, and, on the other, a group of elements common to each of the four compounds; the four different elements were indicated in the spoken and written nomenclature of the compounds by their four names, "iron, copper, soda, lime," while the one group and its presence in each of the four compounds was indicated in the spoken and written nomenclature of the compounds by the word "sulphate"; sulphate of iron, sulphate of copper, sulphate of soda, sulphate of lime.

Up to 1807 no necessity arose for interfering with the nomenclature of Lavoisier; but in that and the following year Davy made his brilliant researches on the alkalies and alkaline earths, discovered that potash, soda, baryta, strontia, and lime were not elements, as previously had been supposed, but that the true basylous radicals of the so-called compounds of potash, soda, baryta, strontia and lime were metals—to which were given the names potassium, sodium, barium, strontium, and calcium. Thenceforward the old names potash, soda, baryta, strontia, lime, were used to designate the oxides of the new metals. Then at once there arose a dilemma in regard to nomenclature. The names of all the salts of Davy's metals were no longer consistent with the names of the salts of all other metals. While on the one hand the names "sulphate of copper" and "sulphate of iron" distinctly expressed the compounds formed by the union of metallic "copper" or metallic "iron" with a common acidulous group of elements, represented by the word "sulphate," the names "sulphate of soda," and "sulphate of lime," as distinctly expressed compounds formed by the union of oxide of sodium and oxide of calcium with a common acidulous radical still indicated by the word "sulphate," but not having the same composition as (having less oxygen than) the similar acidulous radical united with the copper and the iron. It was felt that either such words as sulphate, nitrate and carbonate must each have two significations, and the salts of the alkalies and alkaline earths be considered as compounds of oxides of metals, and all other salts (sulphate of iron, etc.) as compounds of metals, or such words (sulphate, nitrate, carbonate, etc.) must have a common (though an altered) signification, and all oxygen salts be considered as compounds of oxides of metals. Davy, supported afterwards by Dulong, Clark, Graham, Liebig and Daniell, suggested that *all* metallic salts were composed of metal alone on the basylous side, and a distinct radical on the acidulous side. Unfortunately, however, accurate knowledge of constitution was included in this idea; even definite names being proposed for the said acidulous radicals. Thus blue vitriol was termed oxysulphionide of copper (Daniell), sulphatoxide of copper (Graham), and sulphanide of copper (Otto). Many other objections to the theory arose, and hence salts came to be regarded as compounds of oxides of metals with certain acidulous radicals (now known as anhydrides). But the followers of applied chemistry never took kindly to the nomenclature; such names as sulphate of oxide of iron, nitrate of oxide of silver, acetate of oxide of silver, acetate of oxide of lead, got shortened to sulphate of iron, nitrate of silver, acetate of lead; a matter of no great moment to any one who had become a chemist, but of considerable importance to every one learning to be a chemist. The names acetate of lead, iodide of lead, etc., logically planted in the mind the impression that the compounds were formed of lead with the radical of acetates and lead with the radical of iodides,—a natural idea, which had to be unlearned, and by considerable effort of memory a mere conventional one put in its place, namely, that certain acidulous radicals (iodine, sulphur, etc.) combined with metals, while certain others (anhydrides, formerly called acids) with oxides of metals. It is true an explanation was afforded of such anomalies by the assumption that even haloid salts (such as iodide of potassium) on dissolving in water became true salts of oxides of metals (hydriodate of potash); but weighty arguments were adducible against this hypothesis. In short, no theory of the constitution of salts was offered, or has yet been offered, which satisfactorily explains and harmonizes all known facts respecting salts. Hence, when a very few years ago chemists were led by irresistible arguments and stubborn facts to double many of the old atomic weights, an opportunity of abandoning existing constitutional theories presented itself, and was by common consent accepted. The exertions of Dumas, Laurent and Gerhardt bore fruit. The dualistic idea of salts being formed of an acidulous radical with the oxide of a metal, and the not less binary notion of their being composed of a distinct acidulous radical united with a metal, were renounced, and hypothesis altogether rejected, or, at all events, restricted to the idea of *oneness.* These views were, of course, accompanied by a commensurate alteration in chemical notation and nomenclature. Blue vitriol no longer being considered to be the sulphate of the oxide of copper, as shown in the formula $CuO,SO_3$, nor even to have the binary constitution implied in the formula $Cu,SO_4$, but to be a structure *per se*, or, at least, one whose detail of constitution was unknown,—it became necessary to devise for it and all such salts, a notation and a nomenclature which should be consistent with the unitary idea. Strictly speaking, this was impossible. The relationship, nay, the absolute identity of the constituent radicals in whole classes of salts demanded fair representation in notation and nomenclature, a result fatal to pure unitary ideas. Thus, the unquestioned relationship of the cupreous compounds to each other demanded the employment of the word "copper" in their names, and the symbol Cu in their formulæ; while the unquestioned relationship of salts containing the elements which occur in the non-cupreous portion of blue vitriol demanded the employment of the word "sulphate" in their names and the symbols $SO_4$ in their formulæ, and with the employment of such names and such formulæ the binary idea is difficult to repress. At the same time all are agreed that the unqualified assumption of knowledge of chemical constitution involved in the old binary theories is wrong, hence professedly binary systems of notation and nomenclature must be relinquished; the names sulphate of oxide of copper, with its formula $CuO,SO_3$, and sulphate of oxide of magnesia (or sulphate of magnesia), with its formula $Mg O,SO_3$, must be given up for sulphate of copper $CuSO_4$ (or copper sulphate or cupric sulphate), and sulphate of magnesia $MgSO_4$ (or magnesium sulphate). Such names and formulæ sufficiently exhibit unquestioned relationships, while they include the least possible amount of theory.

*Chemical Notation.*—I would offer a few additional sentences respecting chemical notation. All teachers of chemistry, including the authors of nearly every modern manual, with remarkable unanimity, have relinquished the old system of notation, that which was exclusively employed in the British Pharmacopœia of 1864, and have, to a greater or less extent, adopted the new. In the present (1867) Pharmacopœia the new notation is represented by formulæ printed in Egyptian type ($\mathbf{KNO_3}$), the old by formulæ in Roman ($KO,NO_5$); a course suggested by the unsettled condition of the subject at the time this Pharmacopœia was published. It is to be expected that the next British Pharmacopœia—still "representing accurately, yet with caution, the advancement made in chemistry and pharmacy" (*vide* Preface), and reflecting the settled practice of scientific chemists—will employ the usual chemical symbols as expressive of the new atomic weights (O=16) to the exclusion of the old (O=8), and will altogether discard the hypothesis of the constitution of salts involved in such formulæ as $KO,NO_5$, or (accepting the new atomic weights) $K_2O,N_2O_5$, using only the less theoretical formulæ (*e.g.* $KNO_3$) which are now employed by the majority of teachers. The following formulæ will further illustrate what has just been stated:

OLD CHEMICAL FORMULÆ.

| | Old atomic weights and dualistic hypothesis. | Old atomic weights and binary hypothesis. |
|---|---|---|
| Nitre | $KO,NO_5$ | $KNO_6$ |
| Pearlash (anhydrous) | $KO,CO_2$ | $K,CO_3$ |
| Epsom salt (anhydrous) | $MgO,SO_3$ | $Mg,SO_4$ |
| Corrosive Sublimate | $HgCl_2$ and $HgCl$ | $HgCl_2$ and $HgCl$ |

NEW CHEMICAL FORMULÆ.

| | New atomic weights with dualistic hypothesis. | New atomic weights with binary hypothesis. | New atomic weights with unitary hypothesis. |
|---|---|---|---|
| Nitre | $K_2O,N_2O_5$ | $K,NO_3$ | $KNO_3$ |
| Pearlash (anhydrous) | $K_2O,CO_2$ | $K_2,CO_3$ | $K_2CO_3$ |
| Epsom salt (anhydrous) | $MgO,SO_3$ | $Mg,SO_4$ | $MgSO_4$ |
| Corrosive sublimate | $HgCl_2$ | $HgCl_2$ | $HgCl_2$ |

Old atomic weights....K,39; Mg,12; Hg,200 and 100; N,14; O,8; C,6; S,16; Cl,35·5.

New atomic weights....K,39; Mg,24; Hg,200; N,14; O,16; C,12; S,32; Cl,35·5.

THE PROPOSED NAMES.

[We insert a few showing the more radical changes proposed.—EDITOR PHAR.]

The advantages claimed for the proposed names are that they are more consistent with each other than the old; they are formed on one uniform system instead of two; they include less of theory, and therefore have greater elements of stability than the old; and they are harmonious, whilst the old is absolutely inconsistent, with both modern scientific nomenclature and the only chemical notation now employed.

| *Old Names.* | *Proposed Names.* | *Synonyms.* |
|---|---|---|
| Acetate of ammonia. | Acetate of ammonium. | Ammonium acetate.<br>Ammonic acetate. |
| Acetate of iron. | Acetate of iron. | Ferric acetate. |
| Acetate of lead. | Acetate of lead. | Lead acetate.<br>Plumbic acetate. |
| Bicarbonate of soda. | Bicarbonate of sodium. | Acid sodium carbonate.<br>Hydrogen sodium carbonate<br>Mono-sodic carbonate.<br>Hydro-sodic carbonate. |
| Borax. | Borax. | Sodium anhydroborate.<br>Borax. |
| Calomel (syn.) | Calomel (syn.) | Mercurous chloride.<br>Calomel. |
| Carbonate of potash. | Carbonate of potassium. | Dipotassic carbonate.<br>Potassium carbonate. |

| | | |
|---|---|---|
| Caustic potash. | Caustic potash.<br>Hydrate of potassium (syn) | Caustic potash.<br>Potassium hydrate. |
| Corrosive sublimate (syn) | Corrosive sublimate (syn) | Mercuric chloride.<br>Corrosive sublimate. |
| Hydrochloric acid. | Hydrochloric acid. | Hydrogen chloride.<br>Chlorhydric acid.<br>Hydrochloric acid. |
| Lime. | Lime. | Calcium monoxide.<br>Lime. |
| Sulphate of copper. | Sulphate of copper. | Cupric sulphate. |
| Sulphate of iron. | Sulphate of iron. | Ferrous sulphate. |
| Sulphuric acid. | Sulphuric acid. | Sulphuric acid.<br>Hydrogen sulphate. |

*Resume.*—The chief alterations in pharmacopœial nomenclature now proposed amount to this, that the compounds of the alkali-metals and alkaline-earth-metals instead of being named as hitherto on two distinct systems, should follow but one:—that instead of salts of potassium and of potash we should have salts of potassium only; instead of sodium and soda compounds, sodium only; and so with preparations of ammonium, lithium, calcium, magnesium and aluminium. This is a step in the direction of simplicity and permanency, and away from that of theory.

In conclusion, I would state that the Lavoisierian names now proposed for use in medicine and pharmacy have already been freely adopted by many authors, and used as the leading nomenclature of my own and some other Manuals of Chemistry. I commend them to the medical practitioners and pharmacists of Europe, America and the Colonies.

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## EXCERPTA.

*Therapeutical Incompatibility of Quinine and Veratrum Viride.*—Dr. Bradley, of St. Mary's, Ohio, reports that when a patient is under the influence of Verat. V., it is highly dangerous to administer quinine. The effects are alarming; immediate sinking of the pulse, which in some cases reaches collapse.—*Cincinnati Lancet and Observer.*

*Sticks of Mitigated Chloride of Zinc.*—Ordinary chloride of zinc is unsatisfactory as an escharotic, because of its hygroscopic tendency. M. Bruns states that this defect may be overcome by fusing two parts of the chloride of zinc with one of chloride of potassium, and casting in sticks,—the latter to be wrapped in tin foil.—*Practitioner.*

*Manganese in Beech Nuts.*—By some authors it has been denied that plants absorb from the earth such metals as are not absolutely essential to their nutrition. Mr. R. Warrington found in the ashes of beech and birch 0.193 per cent. manganese. Dr. De Vriy states that he has found manganese in beech nuts gathered from several different sources, so that the metal in question must be regarded a normal constituent of the beech.—*Pharmaceutical Journal, London.*

*Glycerin for Show Colors.*—Alcohol may be substituted by glycerin to prevent freezing of the show colors of druggists' bottles. Mr. Chas. Bullock (*Amer. Jour. Pharmacy*), gives the congealing points of mixtures of water and glycerin as follows:

½ pint glycerin in 1 gallon water congeals at 30° F.
1 " " " 1 " " " " 24° F.
1½ " " " 1 " " " " 18° F.
2 " " " 1 " " " " 10° F.
3 " " " 1 " " " " 3° F.

*Ozone Developed by Flowers.*—According to Prof. Montegazza's experiments, the essences of mint, turpentine, cloves, lavender, bergamot, anise, juniper, lemon, fennel, nutmegs, cajeput, thyme, cherry and laurel, in contact with atmospheric oxygen in light, develope a large quantity of ozone, equal if not superior in amount to that produced by phosphorus, by electricity, or the decomposition of permanganate of potassa. Flowers destitute of perfume do not develop ozone.—*Nature.*

*New Method of Discovering Nitrates in Water.*—Mr. Blunt proposes a method of discovering the presence of nitrates in water, which he claims is far superior to the ferrous sulphate test. He proceeds as follows: Having first expelled all ammonia by evaporation, in presence of potassa, and treated the result with distilled water, the liquid is put in contact with sodium amalgam for 12 hours, in a perfectly tight vial. The nascent hydrogen resulting from the decomposition of water by the amalgam transforms the nitric acid into ammonia, and the presence of the latter, as formed, can be detected by Nessler's test.—*Med. and Surg. Reporter.*

*To Render Castor Oil Palatable.*—A correspondent of the *Medical and Surgical Journal*, Boston, says a dose of this oil may be made palatable, indeed, as "sweet as honey," by using the following formula:

℞ Glycerin, pure.
Castor oil, a.a. f. ℥ ii.
Oil cinnamon, mix.

The ol. cinnamon should be rubbed with the glycerin, and the castor oil then added; the whole to be well mixed by shaking when used. In larger doses lessen the proportion of glycerin.

*Dry Pepsin.*—According to Dr. Lionel Beale, the best means of securing pepsin in powder is to simply dry on glass plates the mucous expressed from the pig's stomach glands. It retains its properties for years. Eight-tenths of a grain will dissolve one hundred grains of coagulated white of egg. This powder furnishes, by solution in water, a clear, colurless digestive fluid of great activity.—*Medical Cosmos.*

*Activity of Hyoscyamus.*—M. Donovan has demonstrated by physiological experiments that the leaves of hyoscyamus of one year's growth are comparatively inert, or entirely useless. From two year old leaves he prepared a tincture having the desired activity. Mr. D. gives the following as a means of testing the tincture for its value: Add a little tincture to a glass of water; if the mixture becomes slightly milky, the tincture was made from a two years old plant; if it remain transparent, the plant was in its first year.—*Medical Press and Circular.*

*Preservation of Oils of Orange and Lemon.*—Carl Fruh, writing to the *Amer. Journal Pharmacy*, says he has preserved these oils unchanged for over a year, by the following means: To every pound of oil one ounce of alcohol is to be added, and well mixed; then one ounce of water is put with it, which again withdraws the alcohol from the oil and collects at the bottom of the bottle as dilute alcohol.

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# ON FERMENTATION.

BY PROFESSOR A. W. WILLIAMSON, F.R.S.

*Before the Society of Arts. Reprinted from the Pharmaceutical Journal, London.*

## LECTURE III.

In referring, at our last meeting, to the place in nature which ought be assigned to these little organisms of which we have been speaking, —the ferments,—I stated one ground which appeared to me conclusive, or very nearly so, in placing them in the animal and not in the vegetable kingdom. The ground was a chemical one, viz., that these organs assimilate, or, to use a homely phrase, they feed upon very complex substances, and they give off, during their vital functions, less complex substances. That circumstance appears chemically conclusive in favor of their being rather animals than plants, for plants build up complex substances, and animals assimilate the products which plants have formed, and break them up into simpler ones. There are, however, two other considerations which I think are of such importance that it would be undesirable to pass them over, which tend in the same direction, and are striking confirmations of the conclusion to which we then came. The one is, that whereas plants require for their growth the light of the sun—in fact, their very growth is a process of absorption of heat by their leaves from the rays of the sun—and plants by doing so render heat latent, as we sometimes express it, that is, they cause an apparent disappearance of heat, and lower the temperature of the surrounding space; animals, on the contrary, give off heat during the exercise of their vital functions, and do not need to be exposed to heat or to continuous light for their growth. Now, in both these respects, as in the other respects, these little cells, the ferments, appear to be distinctly animals. I do not know of one case of a ferment requiring or using for its vital processes the light of the sun; they usually grow, and they seem to thrive quite well in the dark. Again, there are well-known cases in which, during their vital functions, they evolve or give off heat, so that I think these are very overwhelming reasons for not considering them as vegetables in their functions, but rather as animals or animal atoms. I have on the table here three or or four liquids, which are in the states of fermentation, of which I have already had occasion to speak several times. The first carboy contains an extract of malt, to which common cane sugar has been added, and some brisk, thriving yeast was then introduced. Effervesence is now rapidly going on, as you may hear by the gas—carbonic acid—which is escaping through the bent tube into the vessel containing lime-water. This liquid contains little soft, nearly round particles, which I was just speaking of as animals, though they certainly do not look like animals. The second flask contains another substance, of which I also spoke the other evening. There is here what I might call gastric juice—it is a mixture made for the purpose of getting lactic acid from sugar. Some pepsine was made to digest a certain quantity of white of egg, and that mixture, whilst still acid, I mixed with some common cane sugar, and put into it some alcoholic ferment, or common yeast. A good deal of the yeast was digested, it disappeared and was dissolved. I thereupon put in more and more, until there was an excess of it left in the flask. It was then kept for upwards of a week in a box which I have been using for the purpose of these fermentations—a metallic box, which is kept, by means of a regulated gas-burner, at a temperature of about 30°. Centigrade, or a little above blood heat. During that time the substance has been gradually undergoing a change or fermentation. It became strongly acid, and I then added a base, at one time potash, and afterwards powdered marble or carbonate of lime, which was dissolved by the acid, and thus a quantity of lactic acid was formed. Here also there are little cells, which, under the microscope, can be seen to be different from those in the first mixture. They are smaller in their dimensions, but yet they present no very marked individual characteristics by which they can be identified. Indeed, the chief, or, I may almost say, the only thing by which we can certainly identify any one of these organisms is by setting it to work, and by seeing what work it performs. In the third carboy I have a mixture which had gone through the phase I have just been speaking of; it contained some sugar with lactic ferment, but when all the sugar had disappeared, and was transformed into lactic acid, I left the carboy in the same warm chamber, and another fermentation has set in, and there is already a considerable quantity of the substance called butyric acid present, and the greater part, if not the whole, of the lactic acid has already passed over into the butyric acid. Here, in this glass dish, there is another ferment still, although, unfortunately, it has got disturbed in coming here. It contained a decoction of yeast, with which was put about 2 per cent. of pure vinegar and about 4 per cent. of alcohol, and I then touched the surface of the liquid, which was perfectly clear, with a glass rod which had been in contact with the vinegar-plant, and left some little particles floating on the surface of the liquid. These little particles, in the course of a day or two, spread over the liquid, and when this vessel came from University College this morning it was covered with a perfectly uniform film, consisting of little cells different from each of the others to which I have called your attention, and quite distinguishable under the microscope. I should state that after the mixture was first made, and after the vinegar-cells were put into it and allowed to grow on it, I supplied them with some additional food twice. On one occasion I added a somewhat larger quantity of alcohol than was intended, and the effect was that the cells were most injuriously affected. They constituted a dense, smooth, white film, and this seemed almost to disappear, and on examination under the microscope it was found that they had shrunk—in fact, they had been killed by a too strong dose of alcohol. This was then allowed to evaporate, and the vinegar-cells very soon again spread over the liquid. I will now commence in another dish a similar experiment. I have in this bottle a mixture of yeast-water and alcohol, with a few drops of acetic acid acid in it. I will pour this into the glass dish, and then put on to the surface some of these little ferments which I have here, and I have no doubt that if we allow this mixture to stand we shall find by our next meeting that it will be covered over with a smooth film, consisting of vinegar-cells, which will be transforming the alcohol into acetic acid. I may show you the strength of the acid in this last instance by putting into it a slip of blue test-paper, which you see is immediately colored a deep red.

With regard to the process by which these cells are propagated some exceedingly interesting experiments have been made under the microscope. Professor Mitscherlich and various others,—Pasteur among them,—have put little alcohol cells under the microscope, putting them first into a liquid upon which they could feed, and they have noticed that the cells, or some of them, gradually swelled out at one side,—that a little wart, if I may use the expression, made its appearance on one side; that this increased in size until it became as large as the original cell, and then it became detached. The propagation of the alcohol cells, the wine ferment, has been seen by several observers to take place by a process of budding. I will show you the growing cells, by throwing on the screen, by means of an oxy-hydrogen lantern, a photograph of the wine ferment, some of which will, I believe, show a little excrescence at the side, and the general arrangement of the cells will be easily detected. This is a photograph from a plate of Pasteur's, and conveys an exact representation of the appearance which the alcohol cells ordinarily present. I will now show you the photograph of the acetic ferments, and the difference in the general appearance is very striking. When examined carefully it will be found that these little vinegar cells are in couples, little masses about twice as long as they are broad, and by degrees they become strangulated at the waist, and ultimately separate. With a considerable magnifying power, it has been found that the wine cells contain granulated particles, but exceedingly little is yet known of their structure. Certainly one of the most promising directions for investigation in the phenomena if life is presented by the study of these various little organisms, which we have so completely under our control.

With regard to the processes by which these cells are propagated, I have mentioned already, that when certain liquids, capable of undergoing decomposition, are exposed to the air, some little cells gradually make their appearance in what was at first quite an unaccountable manner. It was long supposed, and on very good authority, that the oxygen of the air was the active agent in transforming a fermentable substance into these little cells; and Gay-Lussac, one of the ablest of French chemists, who died a short time ago, made some very careful experiments with a view to decide that point. They led him to the conclusion that oxygen was all that was needed in order to initiate the process of fermentation in the juice of grapes, which by itself does not ferment.

It is worth while to state, in general terms, the nature of these experiments. He put into a glass vessel, closed by mercury, a small quantity of grape juice, which was expressed under mercury, so that it did not come in contact with air on its way into the glass jar intended to receive it. This was then kept closed for some time without change. He then introduced oxygen, sometimes from the atmosphere—I am now giving you an account partly of what was done by Gay-Lussac, and partly what was done by others—and sometimes the oxygen was derived from potassic chlorate. Air was used which had passed through red-hot tubes, so that any vital organisms in it must have been destroyed before reaching the grape-juice; and it was found that, in these cases, the access of the air to the substance did induce the formation of yeast-cells, and did induce a process of alcoholic fermentation in the liquid by their growth. The conclusion, therefore, appeared to be established that oxygen was all that was needed for the process. Since that time, however, other experiments have been made, with precautions which were not observed by Gay-Lussac; and I must especially quote a truly masterly investigator, Pasteur, whose extraordinary researches in this subject have certainly constituted an important era in our knowledge of it. Pasteur has made a great number of experiments, partly such as those which had been made before, and partly fresh ones, of which I will describe a few characteristic samples. For instance, he took little glass bulbs, with a long neck bent in several places, like the one I hold in my hand. This little bulb contains some yeast-water, and also about 10 per cent. of sugar, a mixture which is peculiarly susceptible of undergoing fermentation and decompositions of various kinds. When this was introduced into such a bulb, Pasteur boiled the liquid for some time, so that any little living particles which might have entered the bulb with the liquid, by being exposed to the temperature of boiling water, might be killed, and also that any particles which might be lodged in the neck of the flask would be similarly treated and killed. Some of these bulbs he closed, sealing up the tubes whilst still full of steam, and he then put them by in a warm chamber, similar to that which I just now alluded to as being of the temperature of 30° Centigrade, so that they should be under the conditions most favorable to the development of any little living organisms, if such could develope themselves. He so kept them for days, weeks, and months, and I am not sure that he did not keep some for years, and at the end of the whole time he found that in no case was there the production of these vital organisms. I told you that when the tube was closed the vessel was full of steam; of course that steam was condensed on cooling, and left a partial vacum above the liquid, and when Pasteur opened the tube by breaking off the point, the air rushed in violently to fill the vacant space. He found that in almost every case, although not in all, after this air had rushed in, a process of decomposition commenced, and in some cases he found little animacules, and various kinds of mould in others, and he has described a considerable number of different organisms which he got in different bulbs in that manner. It so happened, also, that in one case the tube, I think accidentally, at first remained unsealed, that it was not kept from contact with the air as the others were; still, to his amazement, Pasteur found that even in this one which remained open there were no organisms, that it remained as unchanged as those which were sealed up. Finding this, he repeated the experiment many times, making a great number of bulbs similar to the first, putting some of that same liquid into them, and boiling the liquid for some time, so as to destroy any organisms; but, when they had been killed, he left the bulbs open, and he found that the contents were as effectually protected by the conditions there present as if the tubes had been sealed. He submitted the results to several members of the French Academy; the experiment was repeated by other persons, and the results showed—if there were any exceptions I do not remember hearing of them—that no organisms were produced. You will notice that the liquid which had been boiled was separated by a long, thin tube from the outer air, and the air only had access to it through this long, narrow, tortuous passage, which, moreover, was at first wet inside, because of the condensed steam. Pasteur then cut off some of the tubes, so as to allow free access of air to the contents, without having to pass through this long, narrow tube, and soon after that was done the process of decomposition set in, and he got various organisms formed in his mixture, which developed themselves in the way yeast, mould, and such-like organisms generally do.

I will now leave these experiments for the present, in order that I may tell you of some other discoveries, which will afford a key to them. One of the most important observations was made, at an early stage of the investigations, on the subject of ferments, by Dr. Schwann. He passed air through a red-hot tube, and he asserted, as the result of his observations, that air which had been so heated was incapable of producing the effects which I mentioned just now as having been noticed by other observers as produced by common air; that whereas ordinary air starts fermentation, air which has been passed through a red-hot tube does not. That was what he said, and in some of his observations he was quite correct, but in some others he must have been misled. Shortly after his observations, another German philosopher thought of using cotton-wool as a strainer. He passed air through a glass tube fitted up somewhat in the same manner as the one I have here, with a tolerably compact plug of cotton-wool, which allowed the air to pass through it, but at the same time acted as a strainer, and collected a quantity of dirt at the side where the air entered it; and he found that the air which had been thus strained was no longer capable of producing the phenomena of decomposition, which air in the unstrained or unheated state does. Since then, Pasteur has done the same thing in a more accurate and more decisive manner; and he has repeated the experiment with heated air, with precautions which leave nothing to be desired. One novelty in Pasteur's process is the use of a kind of cotton which is soluble—cotton which has been in contact with strong nitric acid, which is called gun-cotton. It retains the structure and appearance of ordinary cotton, but has this peculiarity, that it dissolves easily in a mixture of alcohol and ether. He put into a tube a plug of this gun-cotton, and then, by means of an aspirator, he drew air through this strainer for a long time, until he had collected quite a quantity of dust. He then took this gun cotton with the dust upon it, and put it into a tube, where he poured alcohol. and ether upon it until the cotton was dissolved, and nothing left but the dust. It that manner he got the lightest portions of the dust and the heavier portions by themselves, as they very soon subsided in the liquid in which the gun-cotton had been dissolved. He then poured fresh alcohol upon them, so as to thoroughly cleanse them, and then put them under the microscope, in order to examine the particles of which they consisted. He found in this dust a great many particles of sand, calcic carbonate, and other mineral particles, as would naturally be expected, and also a great quantity of organic matter—little particles of cotton wool, wood, and so on, and mixed with these he found some little spherical or oblong particles of very different sizes, and of some considerable varieties of shape. Some of these little round particles he found consisted of mere starch, and many of you are, no doubt, aware that starch consists of little spherodial masses of different sizes. These he got rid of by a solvent, and others were then left. which resembled in their appearance so closely the germs of various fungi and organisms of those kinds and eggs of animalcules that they were, to outward appearances, undistinguishable from them. He then took a liquid which had been boiled, but which was capable of decomposing—such a one as I mentioned here—by the action of any of these substances, and he put it into a flask, with precautions which I will not detain you by mentioning now, more than to say that he slid into this liquid, which had not got anything present to induce the formation of organisms, some of the gun-cotton with the dust yet in it. It was the same thing as I mentioned before, only that the substance had got some of this dust from the air added to it; and he found that he also got the formation of organisms very readily and abundantly. He found that these little particles, which were to the eye undistinguishable from germs and spores, behave towards liquids of this kind just as if they were so. In various other ways the same form of experiment has been repeated, and uniformly with the same result, viz., that when little particles collected from the air, particles of extreme tenuity, are put into a liquid susceptible of undergoing decomposition, a great variety of organisms will make their appearance, just as if their seed had been sown in the liquid. This circumstance is one which, I think, will justify us in going back to what I told you of Pasteur's previous observations. I told you that he opened a number of the little bulbs which had contained yeast-water and sugar, so as to allow the air to rush into them. He found that, in some cases, he got one kind of organism produced, and in others another; in fact, he got a great variety. But if, instead of allowing the air to go into these bulbs in this way, he poured the liquid out into an open vessel, he always got the same sort of organisms; there was no variety. The appearance of the particles which resembled germs is, as I said, exceedingly various, and there are many reasons to suppose that if there are the germs of these organisms in the air, there must be an immense variety of them, a variety so great that we could not even venture to guess at its extent at present. When the liquid had free access to all of them, it is found, for reasons which would easily suggest themselves, on reflection, to anybody, that some of them, those which can thrive best upon the particular substance, develope themselves to the exclusion of the rest. I will give you one or two examples of the influence of food upon the development of ferments, instances which are well known, and are of some importance, as serving to prove the point which I have just mentioned. You are aware that the mixture which I have been speaking of, yeast-water with sugar, can be made to undergo alcoholic fermentation. I have already referred to it repeatedly in that point of view. We can make it undergo alcoholic fermentation if we put some alcoholic ferment into it, and keep it at a proper temperature; but if, instead of putting some number of cells—and even a few grains weight consist of an enormous number of cells—if, instead of that, we were merely to leave some of this liquid in contact with the air, we should have no alcoholic fermentation set up in it. That particular mixture of yeast-water and sugar does not, when exposed to all these germs, get yeast-cells developed in it, at all events not to any perceptible extent. Instead of that, it gets cells formed which are similar to those in the second bottle I showed you, which is forming lactic acid, that is to say, the lactic fermentation will set in. The fact is, that the liquid is unwholesome for these particular cells; and does not agree with the alcohol cells, or yeast-cells, so that if a great number of various germs are thrown into these particular substances, those which can thrive better, which are the lactic acid cells, develope themselves, and the alcohol cells do not. Again, if instead of taking this decoction of yeast and sugar, you were to take some grape juice, you would have alcoholic fermentation at once. That is the way it is done. If I were to leave a decoction of malt in contact with the air, in the same manner you would get the same thing set in as a rule. Again, if some of the liquid which I have in the glass dish here—some of the yeast-water with a little alcohol and acetic acid—be left in an open vessel, it gets an organism formed upon it; in fact, that is a process which Pasteur recommends for getting vinegar cells, if you want any. He says the air will, if you give it time, and supply the requisite conditions, start these cells in that mixture, but no alcohol cells, nor lactic acid cells, can be grown in it. It does not suit them; it is a substance which suits vinegar cells, and them only. Whatever may be the variety of the cells present in the air, it only developes those of that particular kind.

(*To be continued.*)

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# EDITORIAL.

## THE CHEMICAL NOMENCLATURE OF THE PHARMACOPŒIA.

To the kindness of the author, Prof. Attfield, we are indebted for a copy of his paper, entitled "The Chemical Nomenclature of the Pharmacopœia, with suggestions for its revision." We have read this essay with the greatest interest, and, concurring as we do almost wholly in the views of the author, we would particularly direct the attention of our readers to the extracts which we print elsewhere in this issue. We were obliged to curtail the paper greatly, but give almost in full the portion devoted to a consideration of the nomenclature of the past, and necessity for revision. No change in the British Pharmacopœia can be immediately effected, for the next issue is some years in the future. The present Pharmacopœia bears the date of 1867, but at that time its revisers had the wisdom to attach due weight to the discussions then pending upon questions of chemical theory, and the foresight to introduce the new system of notation in connection with the old. That the latter will be discarded in the future, there can be no reasonable doubt, and in connection with it there will be adopted a nomenclature more in accordance with the present state of knowledge. Happily, we think, there is no need for delay in the supplanting of obsolete ideas, in the Pharmacopœia of the United States; the committee having in hand its revision is now in session, and is competent to consider the question in all its bearings, and take action accordingly.

Heretofore chemical notation has had no place in the U. S. P.—an omission which should be supplied in future issues, as there can be no objection to the use of symbolic notation in connection with the names or description of all chemical compounds. Another useful addition would be a complete table of the atomic weights of all medicinal elements and their combinations.

In reference to the proposed nomenclature there can be but little diversity of opinion. It is so framed that while it does away with a few familiar names which involve inconsistencies or suggest a theory, it substitutes others free from these objections, and having, therefore, the advantage of permanence, regardless of any new developments of the progressive science of chemistry.

It is true that but few pharmaceutical writers in this country as yet conform to the more recent ideas of notation and nomenclature, but the work of education in this respect is steadily going forward. All of the best works on chemistry embody the new systems, more or less completely, and these manuals serve as textbooks for many, perhaps the majority, of our schools of medicine and pharmacy.

We would very much regret to see the present occasion pass without the introduction of the new notation exclusively, and an altered nomenclature to a considerable extent, in our next Pharmacopœia. In view of the inevitable banishment of the former illogical and inconsistent theories in chemistry, we hope the committee of revision will be fully prepared for, indeed, anticipate the event, and place the Pharmacopœia of the United States among the foremost in scientific precision, as it already is in all that is rational, practical and concise.

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## "SCIENTIFIC SPECIALTIES."

It is full time that incorporated bodies of pharmacy took some decided stand to protect themselves, physicians, and the public from the current of masked quackery, which pervades all parts of this country, under the title "scientific pharmaceutical specialties." We do not doubt that many which we might include in this classification, are strictly reliable preparations, fulfilling the representations of their manufacturers; we are equally sure, however, that the majority of them have not even that claim to the consideration of medical men. It is remarkably strange that physicians who are generally so fearful of "quackery," "patent medicines," and the like, and who are quite acute in their diagnoses of such cases should so utterly fail to perceive that they are encouraging "quackery" every time they associate the word "Elixir" with the names of those who claim to monopolize all the skill and science necessary for the preparation of this class of remedies. We may well say class, for the individual members of it would, if named before us, be astounding; we would be lost in wonderment, and question whether the rules of permutation could show such a result upon so small a basis.

In a recent issue we published the formulary of Elixirs, &c., of the Newark Pharmaceutical Association, and would now commend the action of that body as worthy the imitation of all others.

For the benefit of our readers and physicians we copy the circular which was sent with the aforementioned formulary to the physicians of Newark:

### TO THE MEDICAL PROFESSION OF THE CITY OF NEWARK.

On account of the unreliability of some of the preparations now in use, the Newark Pharmaceutical Association a few months since resolved to place before the physicians of the city, Elixirs of their own make, with formulas in full, for their inspection. Investigation has proved that some of the elegant Elixirs that have been so freely distributed to our physicians, cannot possibly contain what they profess to.

Another important reason that has prompted this action, is the fact that our shelves are filled with samples of the same article, by different makers, and unless the prescription specifies the name of the manufacturer, the patient may at one time get one preparation, and at another time a different one, often causing the physician trouble and impairing the confidence in the druggist. To avoid this, and to provide the public with reliable preparations, the Newark association have undertaken this work, and ask the countenance and co-operation of the medical profession.

Where no special preparation is indicated on the prescription we propose to dispense those of the Newark Pharmaceutical Association.

The accompanying formulary will be sent to each physician in the city, and every druggist can have access to it.

NEWARK, May, 1871.

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Since our last issue, we have received the prospectus of THE LENS, a quarterly journal of microscopy and the allied natural sciences, soon to be published by, and in the interests of, the State Microscopical Society.

This addition to scientific literature will undoubtedly be heartily welcomed by scientists and others, and supply a want long felt, for a *Western* journal devoted to the interests of the natural sciences.

The prospectus promises that *The Lens* shall be thoroughly scientific, advanced and comprehensive, including all matter of scientific interest.

The society has also in hand the publication of a work of much importance to microscopists, viz: A Synopsis of the Diatomaceæ, by Prof. H. L. Smith, of Geneva, N. Y., who is well known throughout this country and England as an authority on this subject. The work is to be printed in 8vo form, amply illustrated by fine engravings, and will make an addition of no small value to the literature of the Diatomaceæ. We cannot too heartily congratulate the society on the step it has taken, as no more useful work can be undertaken than the dissemination of literature pertaining to the vast field of nature which is only revealed by the microscope. The effort now being made by the society is one which involves a vast amount of careful work, and thorough knowledge of the subject, and, we think, should meet with the full support of all interested in scientific pursuits. No better evidence of enterprise and energy can be given by the society than the publication of works which will at once place it on an equal footing with the older societies of Europe.

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THE MAINE PHARMACEUTICAL ASSOCIATION.—This society, for two years in a passive condition, is waking up to new life. At a recent meeting, held in Portland, the question of establishing a school of pharmacy was discussed with much interest, and a committee appointed to confer and ascertain if such a course is practicable. We wish them every success. The following named gentlemen were chosen as officers for the ensuing year: H. T. Cummings, of Portland, President; John G. Cook, of Lewiston, Vice-President; Christopher Way, of Portland, Recording and Corresponding Secretary; A. G. Schlotterbeck, of Portland, Treasurer; H. T. Cummings and Geo. C. Frye, of Portland, and S. Anderson, of Bath, Executive Committee.

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MARYLAND COLLEGE OF PHARMACY.—Dr. Geo. W. Andrews, the well known pharmacist of Baltimore, recently sailed for Europe, whither he goes for relaxation from business cares, and with the hope of re-establishing his health. Dr. Andrews was one of the incorporators of the Maryland College of Pharmacy, and for twenty years has been the president of the institution. At a meeting of the college on the 17th ult., complimentary resolutions were adopted, and an engrossed copy presented, in the name of the college, to the retiring president.

## TRIBUTE OF RESPECT.

At a meeting of the board of trustees of the Louisville College of Pharmacy, held at the college room, Monday, May 8, 1871, President Diehl announced the death of our fellow member, John David Owen, and on motion, the Messrs. Miller, Grable and McAtee, were appointed a committee to draft resolutions expressive of the sense of the college in regard to the sad event, and report at the next pharmaceutic meeting.

At the next pharmaceutic meeting, which, owing to uncontrollable causes, did not take place till Monday, July 17, the committee presented the following resolutions, which were unanimously adopted:

Whereas, It has pleased an all-wise Providence to remove from our midst, by death, our brother, John David Owen, who had endeared himself to us by his deeds of kindness and Christian charity; therefore, be it

*Resolved*, That in the death of John David Owen, the college of pharmacy has lost one of its most promising members, and the church one of its most active and zealous advocates.

*Resolved*, That we extend to his bereaved family, and especially his aged mother, our heartfelt sympathy and condolence in their deep affliction.

*Resolved*, That we wear the usual badge of mourning for thirty days.

*Resolved*, That a copy of these resolutions be presented to the members of his family; that the same be published in the daily papers, and spread on the records of this association.

Fred. C. Miller,
Recording Secretary.

New Publications.—The Northwestern Medical and Surgical Journal. Alexander J. Stone, M.D., Editor. Monthly. St. Paul.

Western Medical Advance and Progress of Pharmacy. An illustrated quarterly journal.

This is the title of a new quarterly, edited by W. H. Lathrop, A.M., M.D., Detroit. Mich., the first issue bearing the date June, 1871. The object of this journal is to give a "concise but comprehensive review of the progress made in medicine and pharmacy,"—to do which in a quarterly of twelve pages will surely be no idle task to its editor. The present number is illustrated by a well executed colored lithograph of eight narcotic plants in flower. The value of this is much marred by the crowding of objects. Subscription price 50 cents per annum.

The Medical Cosmos, a monthly abstract of medical science and art. Geo. J. Ziegler, M.D., editor and proprietor, Philadelphia. Terms, one dollar per year, in advance.

# THE PHARMACIST

AND

CHEMICAL RECORD.

VOL. IV. CHICAGO, SEPTEMBER, 1871. No. 9.

## IMITATED MINERAL WATER.

BY R. ROTHER.

The increasing popularity of this healthful and pleasant beverage again induces the writer to make further comments upon that difficult but instructive subject. Imitated mineral water is the beverage par excellence, and the writer most earnestly hopes that it may some day become the only one; and if it should ever supersede the use of the pernicious alcoholic drinks, it would be unanimously accorded as one of the greatest results that science had ever achieved.

Despite the deplorable difference which exists among the various articles bearing similar names, as furnished by venders everywhere, the demand for the imitated mineral waters has not only remained undiminished, but has surprisingly increased. Which paradoxical circumstance may be accepted as another evidence of unqualified celebrity. Among the numerous products as well as formulas supposed to be and to furnish imitated waters of some particular kind, the writer has never found any two alike, even when derived from the same manufacturer at different intervals. However, it seems to be generally understood by wholesale manufacturers, as well as composers of "Receipts for Mineral Waters," that iron is a characteristic and necessary ingredient of some of the waters, and they usually endeavor to have that in. Now, the wholesale manufacturer who furnishes concentrated solutions or powders, knows by instinct that there must remain no insoluble residue when his product enters the fountain, or else the individual who occupies the middle distance between himself and the consumer might possibly become perplexed by irrepressible sediment, highly offensive to the eye. Consequently, as ferrous salts are prone to absorb oxygen from the atmosphere, and then subside as insoluble ferric hydrate in the presence of alkaline carbonates, even beneath the pressure of carbon dioxide, it is indispensably necessary to add a preservative in the nature of a reducing agent, preferably sodium sulphite, which, at the ordinary atmospheric pressure, slowly, but under an increased pressure, rapidly absorbs oxygen from the atmosphere and changes into sulphate, whilst the iron remains in solution as monoxide. But these imitated waters usually contain the sulphite in immoderate excess, so that the sulphurous flavor becomes very marked and exceedingly unpleasant. The savan, however, who elaborates the "receipt" for the retailer of mineral water, obviates this iron dilemma by prescribing the ordinary hydrated oxide of iron at once, and causes this to be mixed with proportionately large quantities of magnesium carbonate, calcium carbonate, calcium phosphate, and sodium chloride, together with a goodly portion of sodium sulphite. The mixture is then macerated in a quantity of water for some time, and then filtered. The resulting product is now supposed to be strongly saturated with iron, lime, magnesia, etc. (that is the residue on the filter, which is then thrown away). But the filtrate, which is merely a solution of sodium chloride and sulphite, is introduced into the fountain, then charged with carbonic acid, and is now ready for use, and the thirsty drinker imagines it to be Kissingen water probably.

Another successful process, extensively used, and which fell into the hands of the writer, is said to be that of one of the largest mauufacturers in this line. According to it, nine gallons of water is first poured into the fountain, then a double handful of common salt is mixed with a gallon of water, and also poured in; a piece of copperas and a piece of sal soda, each the size of a Brazil nut, are rubbed up in a mortar, together with about 20 grains each of sodium sulphite and manganous hypophosphite, and mixed with water; let stand over night to give the precipitate time to subside; the clear liquid is then filtered off, and also poured into the fountain; this is now charged with gas, and Kissingen is ready. The method of introducing the iron is peculiar, and the originator prides himself upon the successful manner in which the roughness of the iron taste is removed. Of course, the roughness all goes down with the iron as ferrous carbonate, which remains on the filter. For the various other mineral waters, according to these processes, the operation is precisely similar, only that for some waters the sodium chloride is considerably reduced, and occasionally a little Epsom salts and cooking soda are added. In the main, then, such mineral waters are nothing more than salt brine, charged with carbonic acid.

The want of ready and reliable methods for preparing the artificial waters most in demand is deeply felt. But in order to prepare an artificial product as nearly similar to the natural as possible, a certain amount of complicity in the process cannot well be avoided, and this seems to be the only repulsive feature in the way of a general uniformity of composition. There is no doubt but that the great majority of pharmaceutists at least, would prepare the imitated waters themselves, if the vast array of ingredients and difficult quantities, together with the difficulty of combining the iron and silicium, were not such uninviting concomitants of the process. Hence it is evident, that to make the processes inviting and popular, they must be simplified—even extraordinarily simplified—and, recognising the necessity and propriety of such a course, the writer, on a previous occasion, made a preliminary allusion to it. The importance and character of a mineral water depends not upon the presence of traces and infinitesimal quantities of numerous indifferent substances that the analyst so scrupulously records, but solely upon the quality and quantity of the very moderate number of its *grand* constituents. On general principles, this common sense view will be accepted and endorsed by all.

The infinitesimals and indifferent ingredients can therefore be treated as supernumaries or impurities which, being excluded in the imitated product, make this in all respects more refined and superior to the natural article, both as a medicine or beverage. Particularly important in an artificial product is the absence of organic matter, or the ultimate products of its spontaneous decomposition, such as crenic and apocrenic acid, ammonia, and nitric acid. Accordingly, also, the imitated waters should be free from arsenic, barium, strontium; the unimportant traces of lithium, aluminium, manganese; the insignificant traces of bromine, iodine, and fluorine; the useless silicic oxide, and also iron and other substances, when present in too small quantity, to be characteristic. But, above all, should the imitated waters be free from organic compounds: the following list of *grand constituents* will therefore comprise the total source from which the composition of all imitated waters is to be derived, namely: Potassium, sodium, magnesium, calcium, chlorine, sulphuric acid, carbon dioxide, trihydric phosphate, and (exceptionally) iron. Imitated waters with extra quantities of the normal or special ingredients—such as iron bromides, iodides, or sulphur compounds—are, of course, at the option of the inventor. A very pleasant sulphur water can be produced from sodium hyposulphite. The great objection to ferrated waters as a beverage is the unpleasant, astringent, metallic taste. This is peculiar to ferrous salts, and can be considerably relieved by means of citric acid; but, according to the above programme, this is not admissible. Some ferric salts are free from metallic flavor, but most of them are decomposed by alkaline carbonates, and ferric hydrate, insoluble in carbon dioxide, is precipitated. Ferric orthophosphate, dissolved in chlorhydric or sulphuric acid, is precipitated by the alkaline or earthy carbonates unchanged, even completely, from very dilute solutions highly impregnated with carbon dioxide under great pressure. But the ferric pyrophosphate, although precipitated from its solution in sodium pyrophosphate by the acid carbonates of calcium and magnesium, in very dilute solutions under pressure, is not affected by any of the salts of sodium and potassium—not even the carbonates, either in simple concentrated aqueous solution, or in dilute solutions, in presence of carbon dioxide under pressure. However, the concentrated and yet colorless solution of ferric pyrophosphate in sodium pyrophosphate is colored deeply red by alkaline carbonates, which solutions then still retain a decided yellow tinge, notwithstanding that they be largely diluted, either with plain or carbonated water.

The writer proposes, now, that the prominent imitated waters that have become popular by reason of their palatable excellence, be prepared without iron; which in these particular instances can be very advantageously dispensed with; and that only on such occasions and in water containing calcium and magnesium carbonates, the iron be exhibited as ferrous carbonate, when positively demanded. Pyrmont is the type of this latter class. In this case, then, the atmospheric oxygen is expelled by means of carbon dioxide, and the iron introduced is ferrous sulphate. A special iron water much used in Germany, and which really possesses merit not only as a medicine, but also by being pleasantly saline and free from metallic flavor, contains a definite quantity of ferric pyrophosphate dissolved in sodium pyrophosphate, and rendered agreeably saline with sodium chloride. One pint of this mineral water is made to contain 3 to 5 grains of ferric pyrophosphate, 10 to 15 grains of sodium pyrophosphate, and as much sodium chloride. This water can also be modified by introducing sulphates and other salts of sodium and potassium, and if the faint yellow tinge is not objected to, the carbonates of these metals may also be incorporated. It is best and most convenient, however, to keep the solutions for special waters on hand, in concentrated form, and dilute them when called for, with the requisite quantity of carbonated water. These are always in one solution, which is a very commendable feature. For instance, a solution for special ferrated water is made by dissolving 2 ounces of sodium pyrophosphate in a sufficiency of water, and adding to this, solution of ferric sulphate until the precipitate no longer dissolves, a few grains more of sodium pyrophosphate is now added to clear the solution, and then diluted to the measure of two pints, after the addition of several ounces of sodium chloride. Two fluid drachms of this, in 12 fluid ounces of carbonated water, may be taken at a dose.

The writer also considers that it would be an admirable plan, if a certain number of the popular waters were simplified, and the constituents adjusted quantitatively upon a systematic basis, and the formulas published under authoritative sanction.

The imitated waters now most in use are, the ferrated earthy water of Pyrmont (Trinkquelle), the saline of Kissingen (Rakoczy), the alkaline of Vichy (Grande Grille), the less alkaline of Selters, and the happy medium Congress.

In giving the following consolidated and ready methods for the correct imitation of the above waters, it is the design of the writer that their proper composition, as well as the simplicity of the process, shall recommend them to all pharmaceutists. In these processes, no precautions need be taken to exclude the air from the fountains (Pyrmont excepted), as its presence has no action whatever upon the result. The calcium chloride, and also the magnesium chloride, when required in considerable quantity, can be much cheaper and very easily prepared by the pharmaceutist himself, rather than to procure them in the fused condition from the manufacturer. These substances, when thus prepared, are always retained in solution, the strength of which, in case of magnesium chloride, is calculated from the carbonate that was consumed, which yields 10.44 parts of chloride from 10 parts, and the calcium chloride by evaporating a known bulk to dryness, and then weighing the residue. The solution of magnesium chloride is prepared by treating commercial chlorhydric acid with a slight excess of magnesium carbonate; the clear liquid is then poured or filtered off, and boiled with a small quantity of pure chlorhydric acid and potassium chlorate, then neutralized with magnesium carbonate or disodic carbonate, and filtered. The solution of calcium chloride is prepared by treating commercial chlorhydric acid with an excess of calcium hydrate; that is, freshly burned lime is slaked with water, a portion stirred into a quantity of water, and the acid poured in by degrees; more calcium hydrate is then alternately added; finally, the solution is set aside with an excess of calcium hydrate, and after a sufficient repose, the clear liquid is poured off, and treated similarly to the magnesium solution. The solution of the calcium hydrate is best effected in a stoneware crock, as the liquid becomes exceedingly hot after each addition of the acid. An excess of calcium hydrate is necessary to separate contaminating magnesium, iron, etc. The treatment with chlorhydric acid and potassium chlorate is necessary to destroy the crude odor of the commercial acid, also with calcium chloride disodic carbonate is used to neutralize the solution after its deodorization.

### PYRMONT (FOR 100 PINTS).

*First Process.*

The process for this water is in many respects different from any of the others, instead of introducing solutions into the fountain, in this case mostly precipitates are used—for the reason that the water contains but trifling quantities of chlorides, and mainly carbonates and sulphates of calcium and magnesium; but to give the operator advantage of alternatives, two methods will be given:

| | | | | | |
|---|---|---|---|---|---|
| Take of | Calcium chloride, | fused, | 1,063 | grains. | |
| | Disodic carbonate | (crystallized), | 1,519 | grs., | or an excess. |
| | Sodium sulphate | " | 1,371 | " | " |
| | Magnesium sulphate | " | 792 | " | " |
| | Ferrous sulphate | " | 100 | " | |

Dissolve the calcium chloride in 8 fluid ounces of water, and the sodium sulphate and carbonate together in one pint of water, with heat; filter the solution, and while yet hot, add to it the solution of calcium chloride; mix and set aside 10 or 15 minutes, when the precipitate will contract to a heavy crystalline powder; now pour off most of the liquid, without losing any of the precipitate; to the sediment then add the magnesium sulphate; shake up well, and pour the whole into about 12 gallons of water contained in a fountain, and charge with a pressure of about 20 pounds to the square inch; then reopen the fountain, introduce the ferrous sulphate, and finish with a high pressure (about 200 pounds to the square inch) of carbon dioxide. This magma can be prepared in quantity, and the portion for each charge preserved in smaller bottles, or the whole kept in bulk, and the requisite quantity for each charge measured out after thoroughly shaking the mixture.

*Second Process.*

When the operator has on hand the officinal precipitated calcium carbonate and residuary calcium sulphate resulting from the processes of other mineral waters, the operation can be modified as follows:

Take of Magnesium sulphate (crystallized), 792 grains.
Calcium carbonate (precipitated), 531 grains.
Sodium chloride, 116 grains.
Calcium sulphate (dry), 732 grains.

Water sufficient to make the material into a readily flowing magma. The operation is now concluded as in the first process, with the addition of ferrous sulphate as above.

### KISSINGEN (FOR 100 PINTS).

*Solution No.* 1—

Take of Calcium chloride (fused), 1,192 grains.
Sodium chloride, 3,732 grains.
Water, 2 pints.

Rub the calcium chloride to a powder, add the sodium chloride, then the water, and filter the solution.

*Solution No.* 2—

Take of Monopotassic carbonate (crystallized), 295 grains.
Monosodic carbonate, 1,154 grains.
Magnesium sulphate (crystallized), 1,567 grains.
Water sufficient.

Place the monopotassic carbonate in a mortar, rub it to powder, and add the other two salts; now pour on 2½ pints of water; stir until solution is effected, and filter.

Introduce these two solutions into a fountain containing 12 gallons of water, and charge with a high pressure.

These two solutions are easily and expeditiously prepared, and they filter with great rapidity; but the second solution must invariably be made fresh immediately previous to charging the fountain, as it deposits crusts of magnesium carbonate after a few hours' standing. Solution No. 1, however, may be kept in stock; yet both these solutions are simple, and require such a moderate amount of time and labor, that they can very conveniently be made fresh when wanted for charging.

### VICHY (FOR 100 PINTS).

*Solution No.* 1—

Take of Calcium chloride (fused), 303 grains.
Magnesium sulphate (crystallized), 103 grains.
Sodium chloride, 91 grains.

Dissolve the calcium and sodium chlorides in 2 fluid ounces of water, and the magnesium sulphate in 1 fluid ounce, and mix the solutions; let stand 10 or 15 minutes; then pour the mixture on a filter, and add water through the filter to make the solution measure 6 or 8 fluid ounces.

*Solution No.* 2—

Take of Disodic carbonate (crystallized), 7470 grains.
Monopotassic carbonate (crystallized), 270 grains.
Disodic phosphate (crystallized), 218 grains.
Water sufficient.

In an enameled or porcelain vessel heat one pint of water to the boiling point, and add the potassium carbonate. After a few moments add the other ingredients, and sufficient water to make the measure of two pints; continue the heat until everything has dissolved; filter; add water through the filter to make the solution measure two pints, and mix.

*Solution No.* 3—

Magnesium sulphate (crystallized), 383 grains.

Add the 383 grains of magnesium sulphate and the two solutions to 12 gallons of water contained in a fountain, and charge with a high pressure.

The two solutions may be prepared in quantity and preserved in stock. When required immediately, the heat in No. 2 can be dispensed with, and the ingredients powdered in a mortar, dissolved in cold water by trituration, and strained or filtered.

### SELTERS (FOR 100 PINTS).

*Solution No.* 1—

Take of Calcium chloride (fused), 472 grains.
Magnesium sulphate (crystallized) 586 grains.
Water sufficient.

Dissolve the calcium chloride in 4, and the magnesium sulphate in 6 fluid ounces of water, and mix the solutions; now either wring out the liquid with a strainer, and wash the residue with hot water, and again wring out the liquid; or pour the precipitate upon a filter, and add water through it, until the filtrate measure a pint, and mix.

*Solution No.* 2—

Take of Disodium carbonate (crystallized), 2,848 grains.
Sodium chloride, 1,267 grains.
Water sufficient.

Place the dry substances, with sufficient water to measure a pint, in a suitable vessel; apply heat, and when dissolved, filter, and add through the filter sufficient water to make the solution measure one pint, and mix.

The two solutions are now poured into a fountain containing 12 gallons of water, and charged with a high pressure.

These solutions can also be prepared in much larger quantity, and kept on hand for the sake of greater convenience.

### CONGRESS (FOR 100 PINTS).

*Solution No.* 1—

Take of Calcium chloride (fused), 1,602 grains.
Magnesium sulphate (crystallized), 1,630 grains.
Water sufficient.

Dissolve the calcium chloride and magnesium sulphate, each in 2 pints of water; mix the solution; let stand 10 to 15 minutes, and separate the solution from the precipitate by wringing through a strainer.

*Solution No.* 2—

Take of Monopotassic carbonate (crystallized), 291 grains.
Disodic carbonate (crystallized), 3,982 grains.
Sodium chloride, 1174 grains.
Water sufficient.

To one pint of boiling water in a suitable vessel, add the potassium carbonate, and after the lapse of a few minutes, the rest of the material, with sufficient water, to make a solution measuring 2 pints, and filter.

If the operator has a solution of magnesium chloride, prepared as previously described, the above solution (No. 1) can be modified as follows:

Take of Calcium chloride (fused), 866 grains.
Magnesium chloride (in solution), 630 grains.
Water sufficient.

Pulverize the calcium chloride, and add to it the solution of magnesium chloride, and sufficient water to make the whole liquid measure 8 to 12 fluid ounces, and filter.

Pour these 2 solutions into a fountain containing about 12 gallons of water, and charge with a high pressure.

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## "CORRASSA COMPOUND."

I noticed in a previous number of the PHARMACIST, vol. 3, p. 69, a letter from a correspondent asking information upon the so-called "Corrassa Compound." Since then, being requested to prepare some from a sample, I made a superficial examination of the substance.

It is of a light fawn color, resembling Dover's Powder, thus dispelling the idea of its containing "extracts." An examination through a small microscope revealed three powders, of different colors and different degrees of division, and by using sieves of the requisite fineness, these were easily separated.

The first, passing through a No. 90 sieve, of a yellowish color, was unmistakably, powdered gentian.

The second, much coarser, separated by a No. 60 sieve, was of a white color, and proved to be sugar.

The third, which remained in the sieve, was a little cochineal—probably added to color the mixture when taken in water.

As a result of the foregoing examination, the following approximate formula is given, in parts:

| | |
|---|---|
| Powd. sugar | 24 |
| " gentian | 8 |
| " cochineal | 1 |

M.

This is about as harmless a preparation as is ever vended by self-styled doctors, charitable missionaries, etc. The above compound may be obtained of J. T. Inman, M.D., LL.D., etc., New York, at $3.00 an ounce.

Chicago, August, 1871. F. M. GOODMAN.

# ETHEREAL SOLUTION OF QUINIA.

BY CHARLES RICE.

An ethereal solution of quinia has for several years been quite frequently prescribed by prominent physicians in this city and elsewhere, and I have been often requested, especially by physicians in the country, to furnish them a formula for its preparation. Although the different steps of the preparation are simple enough, yet I have repeatedly been informed of failures in the hands of others. In order to furnish to those who are not practical pharmaceutists or chemists, and also to those who have met with ill success, a formula for its preparation, I shall give below the full detail, which will enable any one to prepare it for himself.

The object of the solution is to administer the alkaloid subcutaneously, in which case a much smaller dose is required, and a more speedy action is obtained than when administered internally. The idea of the subcutaneous use of quinia naturally suggested itself to practitioners from the previous similar administration of other alkaloids, especially morphiæ sulphas; but the neutral sulphate of quinia not being soluble to any useful extent in water, and the use of an acid solution being accompanied by pain and often severe inflammation, it was necessary to employ the pure alkaloid; and of all the different solvents, ether seems to have found the most favor.

By the way, I would remark that the practice of some apothecaries, of using dilute sulphuric acid in their solution of morphiæ sulphas, especially Magendie's, is highly reprehensible and denounced by physicians, on account of the pain and inflammation following its hypodermic use, water being all that is necessary.

Most authorities state that 1 part of quinia requires 60 parts of ether for its solution. This statement is quite correct, as far as the solution of the *dry* alkaloid is concerned, and it is by no means easy to prepare a solution even of that strength. But we may readily dissolve the quinia in ether, either at the moment of its precipitation from one of its salts, or at all events while yet in a moist state. The ethereal solution thus obtained may be concentrated to such a strength that 2 minims of it will contain 1 grain (and even more) of quinia, although in this state the solution is too thick for use, and too liable to solidify. Hence quinia (recently precipitated, and yet moist) may be said to be soluble in ether in all proportions, as has been stated already by Bussy and Guibourt (*Journal de Pharmacie et Chimie*, vol. 22, 1852, p. 413, 414).

The strength of the ethereal solution, as employed by Dr. B. W. McReady and other practitioners, is such that 5 minims contain 1 grain of quinia.

*Preparation.* Take 364 grains of sulphate of quinia, which has been (previously to weighing) deprived of its water by drying it at 212° F., mix it with 1 pint of water, and add to it just sufficient dilute sulphuric acid to dissolve it. Filter if necessary, and wash the filter carefully. Introduce the solution into a 4 pint bottle and add sufficient water to make it measure 32 oz. The next step is to precipitate the quinia, and in order to avoid too great an excess of aqua ammoniæ, it is best to make a preliminary trial of the dilute sulphuric acid and aq. ammoniæ to be employed in the process. Introduce into a graduate 1 fl. oz. of the dilute acid, add some strips of litmus paper, and, while stirring, drop in very gradually from another graduate (or burette) aqua ammoniæ, until the litmus paper turns blue. The amount of aq. ammoniæ used is the quantity necessary to saturate 1 fl. oz. of the acid. Now pour upon the solution in the 4 pint bottle a little more than *double* the amount of aqua ammoniæ, corresponding to the amount of dil. sulphuric acid used, in order to precipitate the quinia; for it is not only necessary to neutralize the amount of acid added, but also the other equivalent already contained in the original sulphate of quinia. Immerse the bottle in ice-cold water to absorb the heat generated during precipitation. Have a sound and tightly fitting cork ready, through which are passed two narrow glass tubes, one of them nearly reaching to the bottom of the 4 pint bottle, the other just penetrating the cork, and both cut off at an even height on the upper side. When the bottle has been sufficiently cooled, pour into it 15 fl. oz. of stronger ether and shake; the quinia will be dissolved, and the contents of the bottle will arrange themselves in two transparent layers—the lower one, an aqueous solution of sulphate of ammonia (holding a little ether, and also a trace of quinia in solution), and the upper one, an ethereal solution of quinia. Introduce the cork into the mouth of the bottle, keeping the finger on the orifices of the glass tubes, and invert the bottle. Hold it for a short time in a somewhat inclined position, to allow the watery solution adhering to the sides and bottom to drain down into the lower layer; then remove the finger and allow the lower layer to flow off into a vessel placed below. As soon as the line of demarkation approaches the cork, allow the liquid to pass only very gradually, and as soon as all the aqueous solution has run off, receive the ethereal solution in a 16 oz. graduate. Rinse the bottle with ½ fl. oz. of ether and add it to the former. Allow the ethereal solution to evaporate in a warm place (110–120° F.) until reduced to 2½ fl. oz. Remove it, cover it well to prevent further evaporation, and cool it to the temperature of 60° F. Then measure off into a weighed graduated tube (or minim graduate) 5 minims and evaporate to dryness. Should there be no scales sufficiently accurate to indicate fractions of a grain, use an aliquot multiple of 5 minims, f. i. 50 minims, in which case, of course, you will have to divide afterwards again by 10. There will probably be found more than 1 grain of quinia contained in the 5 minims; hence it is now only necessary to dilute it with ether to the required strength. Let us suppose that the residue of 5 minims weighed 1¼ grains, and that our remaining solution measures 2½ fl. oz.; now in order to make the solution contain 1 grain in every 5 minims, we have the proportion:

1 (grain req.): 1¼ (grains found) = 2½ (fl. oz.): $x$ (fl. oz. req.): whence $x = 3\frac{1}{8}$ (fl. oz.); hence we have to dilute the solution with stronger ether so as to measure 3⅛ fl. oz.

The original amount of sulphate of quinia (364 grs.) employed, contains 40 grs. of sulphuric acid, and 324 grs. of quinia;* now if all the latter were to remain in solution, we should obtain (at the rate of 1 grain in 5 minims) 1,620 minims, or 3 oz. 180 min.; but during the evaporation a portion of the quinia has attached itself to the sides of the vessels; and this should not be scraped into the solution, since it will not only fail to redissolve, but will generally produce a further separation of quinia.

It will sometimes occur, that on pouring the ether upon the precipitated quinia in the bottle, the latter absolutely (or nearly so) refuses to dissolve. This is owing to the presence of undecomposed solution of bi-sulphate of quinia, which seems to prevent the solvent action of ether. By adding a little more ammonia and shaking, the solution will at once take place. But too much ammonia must be avoided, since this gives a tendency to the ethereal solution to deposit the quinia in a short time; at least such is my experience.

The quinia adhering to the sides of the evaporating vessel, may be dissolved off by the aid of a little dil. sulphuric acid, and kept in solution for future use; its amount may be determined by drying and re-weighing it after its removal. Supposing the former weight is 1,020 grains, the latter 1,000 grains, the difference will be the quinia, 20 grs. Now as 324 (equiv. of quin.): 364 (equiv. of sulph. qu.) = 20: $x = 22\frac{38}{81}$, or about $22\frac{1}{2}$ grains of sulphate of quinia.

The ethereal solution, prepared according to the above directions, must be kept in well stoppered bottles, and should not be long exposed to light. I have kept some samples unaltered for over one year.—*American Journal of Pharmacy, July*, 1871.

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* The author's calculations are slightly incorrect. Crystallized sulphate of quinia must be heated to between 110 and 120° C. (230 and 240° F.) to lose all its water of crystallization, when it still retains 1HO of constitution, its formula being $C_{40}H_{24}N_2O_4,HO,SO_3$ and its equivalent weight 373, containing 324 dry quinia and 49HO, $SO_3$. See *Amer. Jour. Pharmacy*, 1855, p. 243. 364 grains sulphate of quinia, deprived of all its water of crystallization, contain, therefore, 316 gains dry quinia.—[EDITOR *Amer. Jour. of Pharmacy.*]

# ON SOLUTIONS OF ALKALOIDS IN MEDICATED WATERS.

BY JOHN M. MAISCH.

In a letter written shortly after his return home from the Philadelphia College of Pharmacy, where he graduated in March last, the late John D. Owen communicated to the editor an observation which is of particular interest to the medical and pharmacial professions. At our request, he commenced some experiments, which remained unfinished when he was prostrated by sickness. Since his demise we have verified his observation by experiment, and now communicate it to the readers of this journal, together with some observations on the subject.

Mr. Owen had dispensed a prescription ordering sulphate of morphia to be dissolved in peppermint water; the latter had been made, according to the Pharmacopœia, by triturating the oil with carbonate of magnesia and water. When the vial was brought back for renewal, Mr. Owen observed that the sides were covered with crystals, which he collected, and proved to be morphia.

The process of the Pharmacopœia alluded to, yields, in all cases, a medicated water possessing an alkaline reaction, which is shown by its effect upon a diluted tincture of turmeric, the latter turning reddish brown. If chloride of ammonium and ammonia water are added to such a medicated water, any soluble phosphate will in a short time produce a dense cloudiness and finally a precipitate. It is unnecessary to enter into the causes of the solubility of magnesia under these circumstances; the fact is a plain one, and the possibility of dangerous effects very obvious. Neutral salts of insoluble (in water) alkaloids may be dissolved in such medicated waters, but the alkaloids will be gradually precipitated in a form in which they cannot be uniformly diffused in the liquid even by agitation; hence the possibility, if the separated alkaloid does not firmly adhere to the vial, that the last dose may contain an excessive amount of a poisonous article; while, in case it should adhere with sufficient firmness, the result might be, at least, disappointment in the effects, if nothing worse, in consequence of insufficient medication.

Heretofore we have advocated the preparation of medicated waters by distillation from the drugs, solely for the reason of their superior flavor and taste. The facts pointed out above furnish a by far stronger argument. As long, however, as the Pharmacopœia allows the preparation of these waters from the volatile oils by the aid of magnesia, it would appear to be the plain duty of the pharmacist to neutralize or faintly acidulate these waters in all cases where salts of poisonous alkaloids are to be dissolved therein.—*Amer. Journal of Pharmacy, July*, 1871.

## EXCERPTA.

*Poison Oak.*—Dr. J. B. A. Risk, of Morgan, Ky., writing to the *Cincinnati Medical Repertory*, states that the erysipelatoid affection of the skin induced by any one of the family of Rhus—whether the radicans, toxicodendron, vernix, etc.—speedily subsides under treatment with a decoction of quercus alba. The diseased parts should be in contact with the decoction for 30 or 40 minutes, or longer, and the application should be repeated every four hours.

*To Remove Nitric Acid Stains from the Hands.*—Wet the skin with sulphate of ammonia, to which has been added some potash lye. This changes the dead skin into a soapy mass, which can easily be removed with sand or fine pumice-stone.—*Medical Gazette.*

*Artificial Malt.*—Dr. H. Fleck has succeeded in producing malt by the action of dilute sulphuric upon the barley. An effort is being made to utilize this process for general adoption by brewers.

*Metalline.*—This is the name given a new composition used for the bearings of machinery. The peculiarity of the material is that it completely obviates the use of oil or other lubricant, while no heating or wearing attends its use.

*Protection of Lead Water Pipes.*—The method of Dr. Schwarz consists in filling the pipes with a warm and concentrated solution of sulphide of potassium or sodium, leaving the solution in contact with the lead for about 15 minutes. An insoluble sulphide of lead is thus formed over the interior surface which, it is said, will effectually protect the pipes from the action of water.

*Desilverization of Lead by Zinc.*—This process is founded on an observation made by Karsten more than 40 years ago, that zinc, if fused with argentiferous lead, on cooling, rose to the surface, carrying with it all the silver, which could be easily separated. The plan was not found, until recently, practically useful, because of the difficulty removing all traces of the zinc from the lead desilvered. Latterly, it has been found that a current of steam transmitted through the molten metal will completely oxidize the zinc, forming a crust upon the surface of the lead, easily removable.

*Phosphorus Pills.*—Dr. Radcliffe suggests (*Pharmaceutical Journal*) the following formula:—Take of phosphorus, 6 grs.; suet, 600 grs.; melt the suet in a stopped bottle, capable of holding twice the quantity indicated; put in the phosphorus, and when liquid, agitate the mixture until it becomes solid; roll into 3-grain pills, and cover with gelatine. Each pill will contain one thirty-third part of a grain of phosphorus.

*Extemporaneous Black Ink.*—

Take Tannic acid.
Gallic " a.a. xx. grains.
Dissolve in water ℥ ii.;
Ferri sulph.
" subsulph. (Monsel's Salt, a.a. xv. grains).
Dissolve in water ℥ ii. Mix the two solutions, and add
Mucilage, f. ʒ ii ss.
Ol. cloves, gtt. ii.

The above ink is none of the cheapest, being about $1.00 per gallon; but, for my own use, I prefer it to every other.—*Polyhistor, in Druggists' Circular.*

*Carbolic Acid in Intermittent Fever.*—Dr. Treulich reports eight cases of intermittent fever promptly cured by carbolic acid. His formula is

℞. Acidi carbolici, gr. iii.
Inf. gent., ℥ v.
Syr. simpl., ℥ i.
M. Dose, ʒ i. *ter die.*

—*Medical and Surgical Journal.*

*Dolomite Light.*—Dolomite, the native carbonate of lime and magnesia, has been substituted for the pencils of lime employed in the calcium light, and with decided advantage—the light combining the features of the calcium and magnesium lights.

*Cundurango*, the alleged cure for cancer, has been examined chemically by Dr. Antisell, of Washington. No crystalline principle was obtained. Whatever medicinal virtues the plant may possess, must reside in a yellow resin, or the extractive. Dr. A. classes the Cundurango with the aromatic bitters.

*Pleis' Fit Powders.*—Dr. A. W. Miller has examined this nostrum—extensively advertised in the East for the cure of epilepsy—and communicated his results to the *American Journal of Pharmacy.* He concludes that the remedy is composed of bromide of potassium, disguised by the addition of a little powdered gentian. Each powder contains about 15 grains of coarsely powdered bromide of potassium and 5 grains of gentian.

*Soda Mint*, much prescribed in Philadelphia as an antacid and carminative, is prepared as follows:

℞. Sodæ bicarb., ℥ ss.
Spt. ammon. aromat., ʒ i.
Aquæ menthæ pip., Oj.

M. Dose, from a dessert spoonful to a tablespoonful for adults; from half to one teaspoonful for infants. This was a favorite prescription of Dr. Geo. Norris.—*Amer. Journal of Pharmacy, July*, 1871.

*Carbolic Cerate.*—Mr. Charles A. Bœhme suggests the following as an excellent formula:

℞. Adipis, ℥ x.
Ceræ albæ, ℥ v.
Terebinth can., ℥ i.
Acid carbol., ℥ i.

Melt the lard and wax together, add the balsam fir, and when it begins to cool, stir in the carbolic acid. The addition of the balsam fir corrects the disagreeable odor of the acid, and renders the preparation slightly adhesive.—*Ibid.*

*Preservation of Tinct. Kino from Gelatinizing.*—To protect this tincture from change, Mr. J. M. Wood uses this formula:

℞. Kino in fine powder, ℥ i ss.
Alcohol, .835, f. ℥ viii.
Water, f. ℥ iv.
Glycerin f. ℥ iv.

Mix the alcohol, water and glycerin and having mixed the kino with an equal bulk of clean sand, introduce into a percolator and pour on the menstruum.—*Ibid.*

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# ON FERMENTATION.

BY PROFESSOR A. W. WILLIAMSON, F.R.S.

*Before the Society of Arts. Reprinted from the Pharmaceutical Journal, London.*

## LECTURE III.—CONCLUDED.

I stated that exposure to a red heat was found by Pasteur to act effectually in destroying the vitality of these little particles, and in every case in which he used air which had been subjected to that heat, he found that the air was incapable of sowing any of these organisms in liquids even the most favorable to them. There was, however, still one remarkable exception, which was presented by the experiment of Gay-Lussac, to which I alluded some time ago. He found that when he used a mercury trough, which he selected as giving him the best condition for the purpose, he got these little cells produced from the air which had been calcined. Now, Pasteur found that mercury exposed to the air, as it is in these operations, has adhering to it a number of those little germs, and that when no more than the ordinary precautions are taken for cleansing the mercury, it has with it a considerable variety of such little organisms, which, if placed in a suitable material, develop themselves and grow quite well. He proved this in various ways. For instance, some of the little bulbs which had been sealed up whilst full of fermentable liquor and steam, and which had been kept for some time in a warm chamber, so as to be certainly free from vital organisms, were opened under mercury, so as to allow the ends of the tubes to be filled with mercury. He then lifted it up, so that nothing came into contact with the liquid but mercury, and passed into them sometimes air which had been passed through a red hot platinum tube, and sometimes oxygen gas given off from melten chlorate, where certainly there would be nothing of organic life present, and in almost all those cases he found that organisms developed themselves. He attributed this entirely to the mercury, because when that was absent the result was the opposite. In order to prove this point more decisively, he took a liquid which was capable of decomposing, kept it for some time in a quiescent state, and then allowed a drop of mercury, in the state in which he had been using it before, to flow into it, and put the mixture into his warm chamber. He soon found that the mercury had carried in the germs of these organisms, and that they developed themselves quite well in it. Certainly any one unaccustomed to such accurate precautions could hardly have anticipated such a result as that, and a result which is, I think, most instructive, as showing what extraordinary precautions are needed, in order to prevent the entrance of these excessively small particles into the materials which we are working with. Side by side with this, I must mention another result of Pasteur's, for it was, perhaps, hardly less startling, and that was, that when, instead of taking the liquid which I mentioned to you just now, yeast water and sugar, he took common cow's milk, or, at all events, the mixture which is sold by that name, and boiled it, with a view of destroying any organisms that might be in it, and then he sealed up the bulbs while still full of steam, so that no air could get into it, and when he kept such sealed-up bulbs for some time in a warm chamber, he found clear evidences of decomposition; he found a turbidity in the substance, a curdling of the nitrogenized materials of the milk; and on taking out some of it, he found it was swarming with little animalcula; and yet he had boiled the milk for a considerable time and had closed the vessel whilst the ebullition was still going on, so that no air could have carried the germs into it before it was closed. Still, there were the little organisms unmistakably present. He then modified his experiment in this manner. He boiled his milk at a higher temperature. I need hardly tell you how that can be done. You are, of course, aware that the temperatures at which water, or milk, or any liquid boils, are different, according to the pressure which the air exerts upon it; that is to say, if you were to boil water here, and then if you were to carry it to the top of St. Paul's, and notice the temperature in each case, you would find that at the greater height it would boil at a lower temperature. If, in like manner, you carried it down to the bottom of a deep mine, and boiled it there, you would find the temperature would be higher; the greater the pressure of the superincumbent air, the higher the temperature at which any liquid boils. Pasteur wanted to make his milk boil at a higher temperature, and for that purpose he resorted to a very simple device. He had a long tube attached to the vessel in which his milk was boiling, bent over at the top, and brought down into a glass jar containing mercury to the depth of fifteen inches or more. Of course, under these circumstances, the steam which was being formed in the vessel, has to force its way up against the pressure of this mercury; the pressure of these fifteen inches of mercury was added to the pressure of air, and a total pressure was obtained, about half as much again as the pressure of the atmosphere amounted to. Of course, the milk had to boil at a higher temperature, corresponding to this higher pressure; and what did he find then? He proceeded, as before, with the experiment, closing the vessel while it was boiling, and not letting any air into it. He then kept it, and he found that no organisms appeared, even on keeping it a very long time; and he was, therefore, led to conclude that the milk must have contained in it some germs which could withstand the temperature at which the milk was boiling at first, but the vitality of which was destroyed by exposure to the higher temperature to which he exposed it in the subsequent experiment. He had reason for that, for other experiments had been made by himself, and by various other philosophers, which proved that many species of organisms can withstand a very high temperature without losing their vitality. In that respect, there are great differences amongst these little organisms which are remarkable and interesting, and will, no doubt, be of value to future investigations. To give you an idea of the great variety presented by them in their power of withstanding heat, I may mention that if I were to heat the contents of this carboy, in which the alcoholic fermentation is going on, to 60° Centigrade (100° being boiling point Centigrade), which is rather more than half, the fermentation would be completely arrested, and the yeast-cells would be killed. On the other hand, the particles in milk are capable of withstanding 100°. Pasteur connected that fact with the circumstance that milk is alkaline, whilst this liquid is acid, and, as a rule, acid liquids destroy the vitality of these organisms at a lower temperature than alkaline liquids. That is not all. There are in the particles themselves great differences in their power of withstanding heat. Amongst the experiments which are particularly remarkable in that point of view, I ought to mention some with regard to the little spores of mould, and such like things; for instance, the *penicillium glaucum*, and some others. M. Pasteur collected some of these; and after taking a little piece of asbestos, or mineral flax, as it is sometimes called, and heating it in a flame, so as to destroy anything adhering to it, he put it carefully into a vessel in which some of this mould was growing, and moved it about, so that a number of particles of the seed of the mould might adhere to it, He then heated the asbestos thus coated with dust to 120° C., a higher temperature than that to which the milk had been exposed; but after putting it into a liquid capable of feeding mould, he found that the mould made its appearance in considerable quantity, so that the germs of that particular organism were not destroyed by 120° of temperature. He even went higher, as far as 125°, and found that that was not enough, but a little over 125° killed them; 130° they cannot stand, so that, according to these observations, the limit appears to be between 125° and 130°.

In all the cases of which I have been speaking, the ferments (because all these organisms are in their nature and functions analogous to the common ferments) were removed from the substances which were employed before the air and such like materials carrying the germs, were brought in contact with them.

With regard to processes for arresting fermentations and decomposition in liquids in which they are taking place, a number of observations have been made which are of considerable practical as well as theoretical importance, in relation to the results which I have been stating. Of course mere heating, carried to a sufficient intensity, will arrest any process of fermentation or putrefaction which may be going on in a substance, and the applications of that process are, of course, exceedingly numerous and important. The only thing is, that we do not know, and it would be most hazardous to suppose that, in any particular case, we can name beforehand the temperature requisite to destroy a particular organism, If any observer were to say that he has exposed a mixture to 100°, and, therefore, the organism must be destroyed, experience would refute him; if he said he had exposed it to 110°, or even 120°, experience again would refute him; but if he had exposed it to 150°, and asserted that he must have destroyed them, it is quite possible that experience might show that there are organisms which will resist even that temperature. It would have been almost impossible, some time ago, to admit, and we could not have admitted, that these organisms would have withstood the temperature which they have been found to withstand; and, therefore, what temperature is sufficient to destroy the organism in any case must be found by experment, and that alone. Amongst other conditions for arresting the process of decomposition or putrefaction, which are in their nature like those of fermentation, I ought to mention the process of drying. All the processes of fermentation which I have been speaking of, and all others, which I could tell you of, are accompanied by moisture. Moisture is present, and is essential to them; in fact, these little organisms are exceedingly soft, wet things; moisture constitutes a great part of their substance, and in a dry medium they cannot live, or if the substance were dried, they would be destroyed by it. Applications, therefore, of a mere drying process, are amongst the most important and interesting of this class of agencies. Many of them are well known. For instance, the ordinary process of preserving fruit by means of drying it. Germs of putrefaction or decomposition may be present in the fruit; but if you merely take away the greater part of the moisture, you render the substance incapable of decomposing. Among the agents which serve for that purpose, there are some which abstract the water, not in a state of vapor, but in the liquid state; for instance, common salt. If you put a piece of fresh meat in contact with salt, or rub it over with the salt, the salt gradually absorbs the water, and draws the water out of the meat. The action is truly a drying action upon the meat, and it is effectual by a perfectly similar process to that which would go on if you exposed the meat in a dry chamber to a current of warm air. In like manner, of course, it is known to many persons that sugar is used just as salt is, to remove water from substances containing it in any quantity. If you were to rub any fruit or animal substance with a sufficient quantity of dry sugar, you would get the sugar dissolved by the water which would be removed from the materials; and amongst the observations which are made in common life, there are some which bear, in an interesting and instructive way, upon what I have been saying to you. For instance, I have heard it said that ordinary jam—fruit and sugar, which have been boiled together for some time—keeps better if the pots into which it is poured are tied up whilst hot. The observation has been so frequently made that one was inclined to think that there must be some truth in it; and I think if we admit that the paper can act as a strainer in the same way as the cotton wool, you will see at once that it must be as people suppose. Take two cases. Suppose one pot of jam, allowed to cool before it is tied down, little germs will fall upon it from the air, and they will retain their vitality because they fall upon a cool substance; they will be shut in by the paper and will soon fall to work decomposing the fruit. If you take another pot, perfectly similar, filled with a boiling hot mixture, immediately cover it over, though, of course some of the outside air must be shut in, any germs which are floating in it will be scalded, and in all probability destroyed, so that no decomposition can take place.

Amongst other materials which serve to arrest fermentation, there are several chemical agents of considerable energy, which are frequently employed for that purpose. Amongst the foremost, I ought to mention creasote, the active material of smoke; and I have no doubt that the antiseptic action which smoke is said to exert upon ourselves—because it is said that smoke is very wholesome, although I do not lean to that view myself—is due to the presence of this creasote or carbolic acid. Every one is aware that one process for preserving meat, which has long been in use, is to suspend it in a chimney in which the smoke of wood is present. The smoke of wood, like that of coal, contains this substance, or one nearly allied to it, and amongst antiseptic agents it is one of the most energetic. A small quantity of this carbolic acid thrown into that fermenting liquid would completely kill the organisms. In the same way, if I were to introduce a little sulphurous acid into any of these mixtures, I should immediately kill the organisms and arrest the fermentation. Sulphurous acid is now largely used for this purpose, being employed, in combination with lime and water, to saturate the cases in which beer is to be stored, so that the wood being impregnated with it, any germs which might find their way from the atmosphere, and set up a process of decomposition, are arrested and destroyed. Another very powerful antiseptic agent is prussic acid, one of the most powerful of poisons to all animal organisms, and it is particularly powerful in stopping the action of these ferments. Another substance, which I think is worthy of consideration, in the same point of view, is a mixture which is, to a great extent, of unknown composition. I refer to the poisonous matter which is given off in tobacco smoke. It must, I think, when present in the air, exert a very powerful antiseptic action upon these organisms. It has been shown, by the experiments of Professor Tyndall, that in the lower vessel of the lungs there are considerable deposits of the dust which floats about in the air; and we are, of course, exposed in that manner to the action of a number of the seeds of these ferments, and, for aught we know, of diseases, because many malignant diseases are attributed to processes of decomposition analogous to those which we have been considering; and they may be—and, as some persons think, are—carried by germs in the air, in the same way as those I have been mentioning. Now, any powerful substance which would kill these germs must, of course, exert a beneficial action, and when persons are exposed to the smoke of tobacco, there is no doubt that some of it enters the lung with the air which is vitiated, and that some of the smoke must be deposited in the lower passages of the lungs with these little mischievous germs, and must certainly somewhat astonish them.

I have here several little apparatus, all alike in their general arrangement; each consists of two little tables, connected together in such a way that air may be made to pass through both of them in one direction, but not in the other. A tube goes from the top of one into the liquid in the second, and the tube from this second passes on into the air; and these bottles can, by means of an aspirator, be supplied with air which has been strained through cotton wool, and no other air can pass into them. The bottles contain the same mixture which I have been talking about so much, yeast-water and sugar, a liquid which decomposes in almost any way you like, for almost all these germs live in it more or less vigorously. After the liquid was put in, it was kept boiling for a considerable time, so that there is, I trust, in the bottles no living organism whatever; in fact, I have reason to believe that any organisms which may have been there have been destroyed by the high temperature to which they were exposed. I might draw hundreds of cubic feet of air through that apparatus, and it would remain entirely unchanged. Next Monday we will resume this again. We will also examine this particular apparatus, which is exactly the same, with this exception, that after the whole had been filled in the manner I have stated, a little mould was introduced by a separate tube into the first bottle. The apparatus will be taken back to University College, where it will be put into the warm chamber, where the organisms will be developed; and I have no doubt the liquid in the first bottle will be in a state of active decomposition before the day is over. Then next week we will draw purified air, which, by itself, has no action on the liquid, and see whether it will carry any germs into the second bottle. I have no doubt that, by Monday next, there will be enough mould upon it to enable us to perform the experiment; and I shall then also have the pleasure of telling you of some applications which M. Pasteur has made of his theoretical results to practical purposes, such as the preservation of wines and such like matters.

(*To be continued.*)

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# EDITORIAL.

## PHARMACEUTICAL LEGISLATION.

The "Irving Drug-Clerk Bill," lately passed by the Legislature of New York, went into effect on the 1st ultimo. This law, intended to restrict the dispensing of medicines to competent persons, is restricted in its exactions—why, we cannot well see, to New York City—its provisions not being in force in any other part of the State. A brief review of this enactment may not be out of place, especially as the subject of legislation touching the interests of practical pharmacy has often been discussed in these pages. The law requires all druggists and their *assistants*, who are engaged in dispensing medicines, and all who may hereafter assume such duties, to present themselves before a Board of Commissioners, and undergo such an examination as that board may indicate as adequate. The board is authorized to issue a certificate or license to such as may pass the prescribed examination. The board, with the concurrence of the mayor, determines the fee which each candidate shall pay for certificates. Any one who shall, after the expiration of six months from the date of the organization of this board, engage in the dispensing of medicines without a certificate of qualification, will be deemed guilty of misdemeanor, punishable by a fine not exceeding $500, or six months' imprisonment, or both, at the discretion of the Court. The compensation to be given to members of the Board to be determined by the supervisors. The Board of Examiners, consisting of "one skilled pharmaceutist, one practical druggist, and two regular physicians," to be appointed by the mayor.

Prof. R. Ogden Doremus is the President of the Board. The subjects upon which candidates will be examined are chemistry, poisons and their antidotes, practical pharmacy, officinal botany, the adulteration of drugs, and prescriptions. As might have been anticipated, this law is extremely obnoxious to the New York druggists. Certain actions or decisions of the Board of Examiners have itensified their disgust. For example, the diplomas of American or foreign schools of pharmacy are totally ignored as evidences of qualification, and, of course, graduates in pharmacy, with years of experience, are subject to examination, and the payment of the fee of $30.00—the price fixed for examination and certificates. This fee is undoubtedly extortionate. In the opinion of New York druggists, the law has been concocted and forced upon them—not with the view of benefiting society, but to afford emolument to a few political partizans. This law ignores the existence of the New York College of Pharmacy, which for more than forty years has labored for the advancement of science, and the higher qualification of apothecaries. The indignity offered to this institution in refusing to accept its diploma as a guarantee of qualification, is unprecedented in history. The Legislature in this law violates the chartered privileges granted this college in 1831, and thus strikes at the vested rights of every institution of learning in New York. In view of these facts, the druggists of New York, have organized an "Apothecaries' Union," having for its object legal opposition to the enforcement of the law. Many, including members eminent for legal knowledge, believe that all laws which in effect legislate men out of the business they have followed for years, under solemn legal sanctions, charters and guarantees, are *ex post facto* in their nature, and hence unconstitutional and void. We await the result of the legal conflict with much interest; but, while contemplating the unenviable state of affairs in a distant city, may we not learn a lesson applicable to our own condition as pharmacists?

Early last spring a bill was introduced in the Legislature of Illinois, involving the very question of the qualification of druggists. This bill was drawn up by a legal gentleman, who was doubtless actuated by the noblest motives; but he failed to produce a document worthy of the important interests at stake, simply from a want of thorough practical acquaintance with the subject with which he dealt.

Favoring the passage of a suitable law, yet fearing the adoption of one entirely unsuitable and inefficient, the druggists of this city assembled, and, aided by the labors of apothecaries and law-makers elsewhere, drafted a law applicable to the emergency. We have already published this document (April, 1871). It was presented during the spring session, but did not come up for a reading.

The public, as well as Legislatures, are awaking to the importance, nay, necessity, for the legal regulation of the practice of pharmacy. The adoption of some law bearing upon this subject is a mere question of time, and cannot be much longer deferred. Shall we, as pharmacists, supinely await any and all enactments, that uninformed or unscrupulous politicians may see fit to inaugurate; or, shall we make an effort to secure an early passage of such laws as meet the approval of practical and well-informed druggists? By the former course, we may soon find ourselves where New York now is; by the latter we may secure laws guaranteeing safety to to the community and protection to ourselves. It is clearly our duty to make every effort at the next session of the Legislature, which, it is understood, will be held in this city, to urge legislation on the "Pharmacy Bill," to a successful issue if possible. We suggest the importance of immediate and judicious action, not only in Chicago, but throughout the State. A good law can now be enacted if the proper effort be made, Two years hence we may be forced to accept a municipal or State law which will be exceedingly irksome and expensive to druggists. We suggest that in each town and city throughout the State the druggists meet. That they take the proposed Chicago bill above referred to as a basis of action, and indicate such modifications therein as they may desire, and forward a copy of the bill, with their own suggestions and recommendations, to the Senators and Representatives of their district, asking them to urge its passage. In this way, each member of the Legislature will come prepared to vote understandingly, and will not endanger the bill by useless arguments and unnecessary delays. We believe, by the law proposed, druggists are amply protected, and the public is prospectively afforded every security desired, while no burden will be imposed on any one.

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## THE CHICAGO COLLEGE OF PHARMACY.

The fall session of the Chicago College of Pharmacy commences October 2d. They enter upon the proposed term with many increased facilities for instruction, including chemical apparatus, chemical and pharmaceutical preparations, books, etc. We bespeak for the school the continued patronage of the discerning public, which has long been aware that Chicago affords opportunities for study unsurpassed anywhere in the West.

### FACULTY.

N. GRAY BARTLETT, *Professor of Inorganic and Pharmaceutical Chemistry.*
ALBERT E. EBERT, *Professor of the Theory and Practice of Pharmacy.*
GEORGE M. HAMBRIGHT, *Professor of Materia Medica and Toxicology.*
JOHN H. RAUCH, M.D., *Lecturer on Botany.*

### LECTURE FEES.

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|---|---|
| Matriculation Ticket, paid but once | $ 2.00 |
| Lecture Tickets, including all branches taught | 30.00 |
| Diploma Fee | 5.00 |

The lectures of the course will be given in the college rooms, 77 Dearborn St., commencing on the first Monday in October, and continuing over a period of twenty-one weeks. During the holidays there will be an intermission of one week.

The Lectures will be given on Monday, Wednesday and Friday evenings—two lectures each evening.

Prof. Hambright will deliver the introductory address on Monday evening, October 2d.

Students arriving in the city are requested to call upon Mr. Albert E. Ebert, corner of State and Twelfth streets, for tickets, or further information.

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It can hardly fail to cause the heart of the American pharmacist to bound for joy to know that Dr. Bliss, from blissful Washington, has announced the blissful intelligence that a cargo of Cundurango has arrived in New York, which will be furnished to the profession at the highest possible prices. "See, the conquering hero comes!" The very name Cundurango has a high and mighty conquering sound—sweetly blended of High Spanish, Guinea Nigger, Fiji, and Whang Doodle. Dr. B. has taken steps to Helmboldize the drug at once. We will soon see it marching on across the Continent, side by side with the other heroic names which, by the magic of paint and cheap blacking, blazoned on every bridge, fence, and crag, from the Atlantic to the Pacific, have been stencilled upon the great American heart.

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NOTICE.—The semi-annual meeting of the Chicago College of Pharmacy will be held on Wednesday, September 6th, at 2½ o'clock. A full attendance is desired.

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## THE BRITISH PHARMACEUTICAL CONFERENCE.

The meeting of this conference at Edinburgh, on the 3d ultimo, was one of unusual interest, as we learn from our valued contemporary, the ***Pharmaceutical Journal and Transactions.*** The papers read before the association were numerous, and of a high order of merit, while the attendance of members was far in excess of previous gatherings.

The following gentlemen were chosen officers for the ensuing year:

President—Mr. H. B. Brady. Vicc-Presidents—Messrs. H. Deane, D. Hanbury, W. W. Stoddart, R. Bentley, J. Ince, J. Williams, R. Reynolds and Savage.

Mr. F. B. Benger, was elected General Secretary, and Mr. T. Glaisyer, Local Secretary at Brighton.

From information which we have received, we are confident that the President elect, Mr. Brady, will be present at the meeting of the American Pharmaceutical Association at St. Louis. We bespeak for this distinguished gentleman a hearty welcome from our pharmaceutical brethren, and from men of science generally.

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## THE AMERICAN PHARMACEUTICAL ASSOCIATION.

The nineteenth annual meeting of the American Pharmaceutical Association occurs at St. Louis on the 12th instant.

This is the first meeting of the Association west of the Mississippi River—of which, in the years to come, there will be many more. We are glad to announce that ample preparations have been made by the local committee for the reception and accommodation of delegates arriving. Will not pharmacists of the North and West unite to make this the largest hitherto held? Many important matters will be brought before the meeting for discussion.

St. Louisans have always shown a large-hearted hospitality towards all associations which have held meetings in their city. There are many objects of local interest in the great and beautiful city of St. Louis, which cannot fail largely to attract visitors. We would simply refer to Shaw's Botanic Garden, the Fair Grounds, the Library Rooms of the Y. M. M. L. A., and the Natural History Rooms. We could hardly find space to catalogue the numerous monuments to public and private enterprise clustering in and around St. Louis. The city invariably shakes off its summer lethargy in September, and wakes up to the most active life.

All parties having articles for exhibition should send them on at once to W. H. Crawford, Local Secretary.

Those who purpose attending the Convention may procure excursion tickets from Chicago to St. Louis, and return, by applying to Jno. W. Ehrman, 387 State street, from September 5th to September 11th, inclusive. Fare for the round trip $12.60. (Same for ladies).

## CALIFORNIA PHARMACEUTICAL SOCIETY.

The twenty-sixth meeting of the California Pharmaceutical Society was recently held in San Francisco. In the absence of the President, the Chairman of the Executive Committee took the Chair.

After the reading and approval of the minutes of the previous meeting, the Secretary, on behalf of the Executive Committee, presented the names of the following gentlemen, who were elected members:

J. R. Nichols, San Francisco; Geo. M. McDonall, Castroville; P. H. Butler, North San Juan.

Mr. Steele also presented the meeting with the names of Chas. A. Tufts, Dover, New Hampshire; Dr. E. R. Squibb, Brooklyn, New York; Prof. E. Parrish, Philadelphia; S. M. Colcord, Boston; T. W. Metcalf, Boston; whom he recommended as honorary members, the same having been approved by the Executive Committee. They having been elected, Mr. Steele then addressed the meeting upon the attainments, industry and devotion to Pharmacy evinced by the several gentlemen thus honored.

On motion, the Secretary reported that the number of members amounted to 100; that the finances of the Society were in a flourishing condition; that he was in receipt, at regular intervals, of 13 periodicals published in the interests of Pharmacy, and that frequent additions were being made to the library.

The Executive Committee reported adversely to instituting a course of lectures for the present, but requested the sense of the meeting upon various topics, such as registry bill, training apprentices, etc.

Debate was here held, and the meeting, after adopting the report of the Committee, referred various questions to them, with power to act.

The matter of closing stores on Sunday was referred to the next meeting.

The Secretary next presented correspondence, among which were printed copies of various "Drug Bills," as passed by the Legislatures of different States. Correspondence ordered placed on file for future reference.

Much discussion ensued upon the subject of examination and registration ot apothecaries, and the meeting resolved that any bill to be considered in the Legislature should be drawn and presented by a joint committee of the California Medical Society and the California Pharmaceutical Society.

The Chairman of the Executive Committee stated also, that the Committee were convinced of the necessity of asking an appropriation from the next State Legislature, wherewith to establish a College of Pharmacy for San Francisco.

Mr. Parks presented a sample of California opium, assaying over 9 per cent. of morphia, and Mr. Steele exhibited various samples of elixirs, syrups, etc., made from formulas of the Newark Pharmaceutical Society, and published in the *American Journal of Pharmacy* and the *Chicago Pharmacist.*

The Chairman called the attention of the meeting to the next annual meeting of the American Pharmaceutical Association, to be held at St. Louis in September. It was resolved that the Executive Committee be instructed to appoint three members of the Society as delegates to the National Convention, and that the Secretary furnish them with the necessary credentials.

The meeting adjourned at ten o'clock to meet the second Wednesday in September.

## LOUISVILLE COLLEGE OF PHARMACY.

At the annual meeting of the College, held at the College Hall, Tuesday, August 8th, 1871, the following officers were chosen:

President—C. Lewis Diehl. First Vice-President—B. F. Scribner. Second

Vice-President—John Colgan. Recording Secretary—Fred. C. Miller. Corresponding Secretary—Emil Scheffer. Treasurer—S. Fisher Dawes. Curator—J. A. McAfee.

The following gentlemen, being duly elected, together with the officers, constitute the Board of Trustees: Dr. Thos. E. Jenkins, Geo. A. Newman, Wm. G. Schmidt, Dan. B. Grable, and Ferd. J. Pfingst.

The meeting was well attended, and much interest manifested in the proceedings.

At a meeting of the new Board of Trustees, held Monday, August 14th, the following Committes were appointed:

*On Charter*—Geo. A. Newman, S. Fisher Dawes, Ferd. J. Pfingst. *On Progress of Pharmacy*—Emil Sheffer, J. A. McAfee, C. Lewis Diehl. *On Drug Market*—Wm. G. Schmidt, John Colgan, H. A. Pfingst. *On Pharmacopœia*—Dr. Thomas E. Jenkins, B. F. Scribner, C. L. Woodbury. *On Unofficinal Formulæ*—Fred. C. Miller, Peter P. Sutton, Edward Kessler. *On Pharmaceutic Legislation*—Emil Scheffer, S. Fisher Dawes, Wm. W. Smith. *On Finance*—John Colgan, Wm. G. Schmidt, Dan. B. Grable. *On Business*—Ferd. J. Pfingst, Benj. F. Alford, W. G. Dinwiddie. *On Room*—S. Fisher Dawes, Fred. C. Miller, J. A. McAfee.

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## BOOK NOTICES.

ON THE SOURCE OF THE RADIX GALANGÆ MINORIS, OF PHARMACOLOGISTS. By HENRY FLETCHER HANCE, Ph. D., etc. With Historical Notes on the Radix Galangæ of Pharmacy. By Daniel Hanbury, Esq., F. R. S. and F. L. S. Extracted from the Linnean Society's Journal—Botany, vol. xiii. A pamphlet of 25 pages, forwarded by Daniel Hanbury, Esq.

Whilst it has been established that the greater galangal is produced by *Alpinia Galanga* (L.), the plant yielding the lesser kind has not until recently been identified. Mr. Hance has finally settled the vexed question, showing that, while the plant is closely allied to the *Alpinia Calcarata* (Roscoe), it is a perfectly distinct and well-defined species, differing in several particulars of structure, as well as in sensible qualities. He gives a full description of the lesser galangal plant, and proposes for it the name of *Alpinia Officinarium*. The historical notes added by Mr. Hanbury give the paper additional value.

THE EYE, IN HEALTH AND DISEASE. Being a series of articles on the Anatomy and Physiology of the Human Eye, and its Surgical and Medical Treatment. By B. JOY JEFFRIES, A.M., M.D. Boston: Alexander Moore, Lee & Shepard. New York: Lee, Shepard & Dillingham.

This is an elegant little quarto of 120 pages, on the subjects indicated in the title. The articles originally appeared in that ably conducted monthly *Good Health*, and their publication in book form has followed.

Any one who may have attempted to demonstrate the anatomy and physiology of the eye to a popular audience will, we think, be ready to congratulate Dr. Jeffries upon the manner in which he has presented this part of his subject. The most important chapters of the work, however, are those describing those abnormal or diseased conditions of the eye which from ignorance are allowed to continue without proper consideration or remedy for months, years, or a lifetime, to the very serious loss of the individual. We refer to near, far, and oversightedness, incipient cataract, astigmatism and strabismus. These subjects are treated of in a clear and interesting style, and embody information which, we have no doubt, has resulted in great benefit to many readers. Of course, in such a treatise, the ophthalmoscope receives a due share of attention. The history of it is quite full, and its value well set forth. The concluding chapter treats of injuries to the lids and eye, and of their general care and treatment.

Although these articles were intended for the laity, the general practitioner will read them with profit. To him they will serve as a summary of many recent facts in ophthalmology.

The book is provided with a full index. It contains also a number of pages of test type, which will enable the reader to contrast his power of vision with that of the healthy eye.

# THE PHARMACIST

AND

CHEMICAL RECORD.

VOL. IV. CHICAGO, OCTOBER, 1871. No. 10.

## THE MEETING OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

### EDITORIAL CORRESPONDENCE.

The nineteenth annual meeting of the American Pharmaceutical Association convened in the lower hall of the Polytechnic building in the city of St. Louis, on the 12th of September, 1871, at three o'clock P.M. In the absence of the President and Vice-presidents, Professor Farris Moore, of Baltimore, was called to the chair. Prof. John M. Maisch, the permanent secretary, officiating as such.

A Committee on Credentials was appointed. During the recess of this committee Mr. H. B. Brady, of Newcastle-on-Tyne, England, the President elect of the British Pharmaceutical Conference, was introduced by the President, and unanimously elected a member of the Convention, Mr. Brady acknowledging the courtesy by a brief address. The Committee on Credentials subsequently reported the following colleges and associations duly represented by accredited delegates to the Convention:—The Colleges of Pharmacy of Philadelphia, New York, Massachusetts, Maryland, Chicago, St. Louis, Louisville, Kansas, Mississippi and Ontario (Canada); the Pharmaceutical Associations of New Jersey, Newark, Columbia (Washington), and the Alumni Associations of the Colleges of Philadelphia, New York and Massachusetts, and the Pharmaceutical Department of Michigan. The delegation of this latter institution was objected to, on the ground that it was not a pharmaceutical college in the proper meaning of the term, its prescribed course of study and qualification for graduation being insufficient. It was referred to a committee of one member from each college and association represented, which subsequently made the following report: The committee, having made a thorough examination of the requirements of the University of Michigan, states that it is not, within the proper meaning of the constitution of this Association, a college of pharmacy, as it is not an organization of learning which, by its rules and regulations, insures to its graduates the proper practical training necessary to place them on a par with those of the several colleges represented in the assembly. In consideration of this, the Committee recommends the return of the credentials.

The Committee appointed for the nomination of officers for the ensuing year reported the following names, which were balloted for and unanimously elected:—

President—Enno Sanders, St. Louis, Mo. First Vice-President—C. Lewis Diehl, Louisville, Ky. Second Vice-President—George F. H. Markoe, Boston, Mass. Third Vice-President—Matt. F. Ash, Jackson, Mississippi. Treasurer—Chas. A. Tufts, Dover, N. H. Secretary—John M. Maisch, Philadelphia, Pa.

Executive Committee—Thos. S Wiegand, Philadelphia, chairman; Wm. H. Crawford, St. Louis; Charles L. Jefferson, Philadelphia; Chas. H. Dalrymple, Morristown, N. J.; John M. Maisch, Philadelphia, secretary *ex officio.*

Committee on Progress of Pharmacy—Thomas H. Jenkins, Louisville, chairman; Henry W. Scheffer, St. Louis; Jos. L. Lemberger, Lebanon, Pa.; Jas. R. Mercein, Jersey City, N. J.

Committee on Drug Market—Jno. McKesson, Jr., New York, chairman; C. F. G. Meyer, St. Louis; Richard M. Shoemaker, Philadelphia; John J. Thomsen, Baltimore; Geo. W. Sloan, Indianopolis.

Committee on Scientific Queries—Thomas Doliber, Boston, chairman; William Proctor, Jr., Philadelphia; James W. Mill, Chicago.

Committee on Unofficinal Formulas—E. L. Milhau, New York.

Committee on Adulteration and Sophistication—Chas. B. Smith, Newark, N. J., chairman; Joseph P. Remington, Philadelphia, Pa.; Edward Mallinckrodt, St. Louis, Mo.

The newly-elected President being absent, the First Vice-President took the chair.

The next business was the reading of the report on the drug market, by Mr. John McKesson, of New York City, chairman of the committee, which was well arranged, and listened to with deep attention. This was followed by the report on adulterations, read by the chairman, Jos. P. Remington, of Philadelphia, Pa., after which followed the report on photographs, which stated that about one hundred and twenty-five portraits of members had been received, and would enable them to establish vol. i. of the series. The question in relation to the sale of liquors by pharmacists, was next brought up for discussion, and a committee was subsequently appointed, consisting of Prof. J. F. Moore, Dr. E. R. Squibb and Robert J. Brown, who are to confer with the Congress of the United States on this subject. A committee was also appointed, to whom was referred the subject of the revenue stamp tax, with instructions to report what action should be taken by the Association to secure a remedy for this abuse. The following names were proposed by the Executive Committee for honorary membership: Henry B. Brady, Newcastle-on-Tyne, England; Professor Dr. J. Attfield, London, England; Professor Theo. Redwood, London, England; Dr. DeVrij, Holland; Leon Soubeiran; Aug. Amb. Delondre and Professor Dr. Chevalier, Paris; Professor Dr. Adolph Duflos, Breslau, and H. Ludwig, Jena, Germany; Antone Von Waldheim, Vienna, Austria, who were unanimously elected.

The majority of the committee on the International Pharmaceutical Congress reported favorably, and the following committee was appointed to make arrangements for the meeting in 1876, to be held at Philadelphia, and to extend an invitation to the International Pharmaceutical Congress of 1872 to meet with us at that time—Professor E. Parrish, Philadelphia, Pa.; George Buck, Chicago; E. S. Wayne, Cincinnati; E. L. Milhau, New York; S. M. Colcord, Boston, Mass.

On motion, the Secretary was instructed to telegraph a fraternal greeting to the North German Apothecaries' Association, which met in Dresden, Germany, that day. The Chairman of Committee on Papers and Queries then read his report, comprising some 70 queries, with the names of those who had accepted them for examination. The reading of papers was next taken up, and the following were read during the several sessions.

A paper by Daniel Hanbury, F.R.S., London, England, was read by Mr. H. B. Brady, it being a copy of instructions to the Colonial Government of Virginia, issued in the 16th century, in relation to the exportation of indigenous drugs.

*Query No.* 1. On the preparations of Rennet, was answered by Clemmons Parrish, of Philadelphia, Pa.

*Query No* 2. How camphor may be reduced to a fine powder, and retained in a pulverulent condition, was answered by J. C. Lowd, of Boston.

*Query No.* 3. An examination of the extracts of meat of commerce, was answered by Albert E. Ebert, of Chicago.

*Query No.* 9. On glycerin, was answered by Joseph P. Remington, of Philadelphia, Pa.

*Query No.* 10. On suppositories, was answered by R. B. Ferguson, Washington, D. C.—Mr. H. B. Brady, England, made some remarks on this subject, and presented samples of suppositories and pessaries.

*Query No.* 13. On olive oil and its adulteration, was answered by H. M. Rittenhouse, Philadelphia, Pa.

*Query No.* 16. On a system of apprenticeship to pharmacy adaptable to this country, was answered by S. M. Colcord, of Boston, Mass.

*Query No.* 20. The purity of subcarbonate of iron of commerce, was answered by P. W. Bedford, of New York City.

*Query No.* 22. On the morphia strength of tincture of opium, was answered by L. M. Rice, of New York City.

*Query No.* 23. What are the best containers, or what other precautions can be devised for poisonous drugs, to lessen the liability to mistakes in dispensing or handling them, was answered by W. C. Bakes, of Philadelphia, Pa.

*Query No.* 27. On African saffron, was answered by Professor Jno. M. Maisch, of Philadelphia, Pa.

*Query No.* 29. On aromatic sulphuric acid, was answered by Thomas Doliber, Boston, Mass.

*Query No.* 30. On medicated and aromatic waters, was answered by S. A. D. Sheppard, of Boston, Mass.

*Query No.* 31. What proportion of magnesia is contained in the solutions of citrate of magnesia, as obtained from different sources, and how do these solutions differ from the officinal? was answered by Professor G. F. H. Markoe, of Boston.

*Query No.* 36. What menstruum is best adapted for preparing fluid extract of senega, was answered by H. W. Rittenhouse, of Philadelphia, Pa.

*Query No.* 37. What is the best formula for solution of citrate of magnesia? was answered by E. H. Sargent, of Chicago.

*Query No.* 38. What is the mode of action of Persian insect powder? was answered by S. G. Garrigues, East Saginaw, Mich.

*Query No.* 41. Glycerin as a substitute for sugar, in mixing fluid extracts, was answered by W. J. M. Gordon, Cincinnati,

*Query No.* 43. On the infusion of wild cherry bark, was answered by Joseph L. Lemberger, Lebanon, Pa.

Volunteer papers were contributed by Dr. E. R. Squibb on Chloral Hydrate, Fluid Extract of Cantharides, Fluid Extract Senega, Extract of Jalap, Bicarbonate of Soda, Pareira Brava, Litmus Paper, and Rhubarb. By William Saunders, of London, Canada West, on Pharmacy in Canada, and on the Alcoholic Extracts of the Pharmacopœia. By Professor A. B. Prescott, Ann Arbor, Mich., on Pharmaceutieal Education, and Sulpho-carbolic Acid and its Salts. By George C. Close, of Brooklyn, N. Y., a paper entitled Pharmaceutical Notes. By J. L. Lemberger, of Lebanon, Pa., on Urethral Suppositories. By Aug. Theo. Moith, Fishkill, on Hudson, N.Y., on Artificial Mineral Waters.

Mr. C. Lewis Diehl, of Louisville, Ky., explained an outline drawing of an apparatus for the preparation of aqua ammonia from sulphate of ammonia.

A volunteer paper by Joseph W. Harrop, Leavenworth, Kansas, on Pressed Herbs. On the Preparation of Syrups by cold percolation, by L. Ornisky, Hannibal, Mo.

The Business Committee offered the following resolutions:—

*Resolved*,—That the Business Committee be instructed to consider the expediency of a board of direction, which shall meet simultaneously with the Association, and transact business approved by the Association.

*Resolved*,—That the warmest thanks of the members of this Convention are due and are hereby tendered to the pharmaceutists, druggists, and the citizens generally of St. Louis, for their cordial and generous hospitality, and that we join with them in their bright hopes and aspirations for the growth and prosperity of the Mound City.

Adopted.

*Resolved*,—That the thanks of the Association are tendered to the press of St. Louis for their efforts to spread such portions of our proceedings before the public as possess general interest.

Adopted.

Other resolutions, thanking the Board of Public Schools for the use of the hall, Mr. Crawford, local secretary, and the various local committees, were offered and adopted.

The Permanent Committee on the Pharmacopœia consists of the following:—Prof. George F. H. Markoe, from the Massachusetts College of Pharmacy; Prof. J. Faris Moore, of the Maryland College of Pharmacy; Prof. Albert E. Ebert, of the Chicago College of Pharmacy; Alfred B. Taylor, of the Philadelphia College of Pharmacy; P. W. Bedford, of the New York College of Pharmacy; M. W. Alexander, of the St. Louis College of Pharmacy.

On motion of the Business Committee, Mr. Henry C. Gaylord, of Cleveland, Ohio, was proposed for local secretary for the ensuing year, and was unanimously elected.

The Secretary stated that 107 new members had been elected during the sessions.

The minutes were then read, and the Association adjourned to meet at Cleveland, Ohio, on the first Tuesday of September, 1872.

A. E. E.

## SOLUTION OF SUBACETATE OF LEAD.

BY R. ROTHER.

The officinal solution of diplumbic acetate $(C_2H_8O_2)_2Pb''.Pb''O$ is one of the most inconstant preparations of the pharmacopœia. In this process the quantities of material employed are so adjusted, that were they officinally directed in the proper condition, the resulting product would be diplumbic acetate. But the plumbic oxide of the pharmacopœia, owing to the peculiarity of its constitution and method of preparation, is totally unfit for this purpose. The writer, in all his experience with this preparation, found but a solitary sample of litharge, which dissolved without residue, and as a general rule, the greater part of it invariably remained insoluble, whether digested in the cold, or after prolonged boiling. In such cases, the preparation would therefore be nothing more than a solution of the normal acetate $(C_2H_3O_2)_2Pb''3OH_2)$, containing an indefinite proportion of sesquibasic, and none whatever of the dibasic salt. The measure of the ultimate product is also not directed; but which, if it contained only diplumbic acetate, as is obviously the officinal intention, should be made to measure 4½ pints, thus presenting 1 troy ounce of diplumbic acetate in 3 fluid ounces of the solution. Owing to the unsatisfactory results of the officinal method, the writer discarded the use of litharge altogether, and resorted to the plumbic hydrate made by precipitation. As will be evident, this modification of the procedure eliminated the objectionable features by yielding a definite product, and simplifying the operation.

Freshly precipitated plumbic hydrate is readily and completely soluble in a warm solution of the normal plumbic acetate, and the compact, curdy character of the precipitate admits of its most easy and perfect separation by means of a strainer from the precipitating liquid.

The officinal formula employs 16 troy ounces of normal plumbic acetate, and 9½ troy ounces of semivitrified plumbic oxide, and attempts to form a solution by boiling the mixture with 4 pints of water for half an hour. The second lead molecule of the compound to be generated is represented by 16 troy ounces more of normal plumbic acetate. If, now, 16 troy ounces of this salt be treated with 4¾ ounces of pure potassium hydrate (free from carbonate) which is a slight excess, the requisite quantity of plumbic hydrate necessary to furnish the extra molecule is precipitated.

This is now separated with a muslin strainer, and the solid residuary cake heated nearly to boiling, with 16 troy ounces of the normal acetate, dissolved in about 3½ pints of distilled water. If the potassium hydrate was free from carbonate, the precipitate will dissolve completely, otherwise a small residue of plumbic carbonate will remain after filtration. This may be dissolved in a few drops of acetic acid, and incorporated with the solution. The liquid strained from the precipitated plumbic hydrate is a solution of potassium acetate, which can be utilized by adding potassium carbonate to remove a trace of lead held in solution by the slight excess of alkali first used, the solution neutralized with acetic acid after filtration, and evaporated to dryness.

The new formula for solution of diplumbic acetate is then as follows:

Take of Normal plumbic acetate (cryst.), 32 troy ounces.
Potassium hydrate (pure), 4¾ troy ounces.
Distilled water sufficient.

Dissolve 16 troy ounces of the lead salt in 3 pints of distilled water, with heat. Dissolve the potassium hydrate in 8 fluid ounces of distilled water, and mix the solutions; continue the heat a short time longer, and when nearly cooled, pour the magma on to a muslin strainer, and wring the liquid out with thorough pressure. Dissolve the remaining 16 troy ounces of the lead salt in 3½ pints of distilled water with heat; to the solution add the magma of plumbic hydrate, and continue the heat until this has dissolved. Now add distilled water to the measure of 4½ pints. Mix and filter.

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## MEDICATED WATERS.

BY R. ROTHER.

This apparently unimportant subject has been under discussion by many commentators, especially those of Europe, and closer scrutiny of it reconciles the opinion that further study in its behalf is obviously justifiable. Most of the medicated waters, particularly the aromatic, were formerly directed to be prepared by distillation, and at the present day it is the only authorized method in most of the States of continental Europe. The United States Dispensatory in its comments upon this subject sets forth the disadvantages of the method by distillation and the resulting products as compared to our simple and more expeditious officinal method, and the more satisfactory character of its results.

Yet, notwithstanding the superior elegance of the officinal process, the use of magnesium carbonate for this purpose is open to a fatal objection, owing to the circumstance that magnesium carbonate is not insoluble in water. The Dispensatory states that the alkaline character of the water thus acquired decomposes the salts of morphia, mercury, and silver by precipitating their insoluble bases, and that eventually a part of the magnesium carbonate itself separates.

By reason of the viscid flakes that separate from some medicated waters thus prepared, and the heavy crusts of magnesium carbonate which by time deposit from all, it is probable that either a portion of the magnesium hydrate, of which the officinal magnesium carbonate is largely composed, is first dissolved by the water and subsequently again precipitated as carbonate by absorption of carbonic acid, or that by the use of cold water a greater amount of magnesium carbonate is dissolved, which again deposits as the temperature of the water rises, or that the acidity of some oils which are not fresh causes the temporary solution of the magnesium compound. The object of the magnesium carbonate is to effect the solution of the volatile oil by presenting it in a finely divided condition to the utmost available action of the solvent. Other insoluble solids are occasionally employed to meet the same end, and the supposition prevails that such a procedure alone aside from distillation will insure a saturated solution. The Dispensatory in this connection refers to the older method of the Dublin pharmacopœia as being totally insufficient in comparison, since this consisted simply in agitating an alcoholic solution of the oil with water, whereby it is thought but a very feeble impregnation of the water is effected, and furthermore, that the minute quantity of alcohol thus introduced was objectionable per se, aside from the fact that it is liable by the high degree of dilution to pass into the acetous fermentation and render the water sour. However, no medicated water of any kind should be kept so long on hand as to become deteriorated by time, the simplicity of the modern processes admits of no apology for that.

The most perfect and convenient process by which the division of the volatile oil can be secured so as to expose the greatest possible surface to the contact of the solvent, is beyond dispute the method of precipitation, and this is performed by dissolving the oil in alcohol and agitating the solution with a large volume of water. The requisite quantity of alcohol in any case need not exceed four times the volume of the oil, and although there exists a marked difference in the solubility of volatile oils in water, a solution of one minim in two fluid ounces of water can invariably be obtained, but frequently much more will dissolve, and therefore an excess of oil should always be used to make a saturated solution.

The writers' process for the aromatic waters, with the exception of camphor water consists in using the officinal quantities of oil and water, together with four times as much alcohol as volatile oil. It is performed by dissolving the oil in the alcohol and pouring this into an appropriately sized bottle two-thirds full of distilled water. The mixture is now violently shaken for a few minutes and the solution passed through a filter previously moistened with water.

The writer finds that the officinal quantity of camphor is much too great for the prescribed quantity of water. It is a grand mistake to assume that one pint of water dissolves 50 grains of camphor, which the Dispensatory distinctly states. The writer finds by gradually adding an alcoholic solution of camphor to a measured quantity of water that one fluid onnce of it at the ordinary medium temperature will dissolve nearly three-quarters of a grain of camphor, and that ice-cold water will dissolve nearly 20 per cent. more The superior solvent power of cold water upon camphor can be very forcibly exhibited by agitating an excess of camphor previously dissolved in alcohol with ice-cold water, and filtering into a bottle until this is so full as to safely admit the insertion of a cork. The bottle is now securely closed and set aside. As the temperature of the water rises the camphor begins to separate abundantly in shining crystals, which remain suspended until the water has reached the normal temperature, when at the end of twelve hours they will have mostly collected on the narrow surface of the liquid.

The writer makes camphor water by dissolving 30 grains of camphor in two fluid drachms of alcohol, pouring this solution into two pints of water, agitating for a few minutes in a bottle, as above directed, and filtering.

Chlorine water is a very unstable preparation. It should always be either fresh or quite recently prepared before use. But as the officinal process is not an extemporaneous one, and as the preparation is but rarely used in some localities, it becomes very difficult for pharmaceutists to furnish at all times chlorine water of the officinal strength.

Chlorine water rapidly deteriorates when exposed to light or in partially filled bottles by abstracting the hydrogen of the water and forming chlorhydric acid. An extemporaneous process would therefore be very desirable. A method of this kind is much in use, and although the product may be equally efficient, it nevertheless is not by any means chlorine water in the officinal meaning of the term. In this process potassium chlorate is acted on by chlorhydric acid, and the deep yellow solution diluted with water, the result is mainly a solution of a mixture of the lower oxides of chlorine and probably free chlorine. The writer has long employed an extemporaneous process, which yields a solution of pure chlorine, however containing sodium chloride, which is not an objectionable impurity. The method consists in the use of the officinal solution of chlorinated soda, chlorhydric acid, and water. The officinal solution of chlorinated soda is a a mixture of sodium hypochlorite, disodic carbonate, and sodium chloride, in aqueous solution. When brought in contact with chlorhydric acid the sodium carbonate is first converted into sodium chloride with evolution of carbon dioxide, and secondly, the sodium hypochorite is decomposed into free chlorine and sodium chloride.

The process is conducted by pouring into a quart bottle four fluid ounces of solution of chlorinated soda previously mixed with twelve fluid ounces of water, and then diluted chlorhydric acid by gradual addition until, firstly, the carbon dioxide has been liberated and expelled, and secondly, the available chlorine has all been set free and absorbed by the water, aided by frequent agitation. This product seems to be more permanent than the officinal article, as it retains the powerful odor of chlorine for a considerable time even in bottles partially filled, if they are kept cool and excluded from the light.

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## BOTANY—THE REQUISITES FOR A PROFITABLE STUDY.

BY CHAS. FREDIGKE.

In surmounting the first principles of any science, the learner often despairs, a lasting dislike paralyses the first courageous attempts; because in every-day life we are not called upon to scrutinize matters by close examination, we skip them as soon as we have the faintest idea that they are of no practical advantage. And, above all, as society is at present constituted, it offers so many distracting diversions, that it requires a firm resolution on the part of not a few to avoid being drawn into the general vortex of seekers after pleasure, to the neglect of the marked course of duty or study.

There are no so-called easy methods of learning anything thoroughly. It requires resolution and patience, for there is no other way of reaching the nut except by cracking the shell. If we only master the first principles, botany will be found one of the most attractive of sciences. A knowledge of botany is an indispensable auxiliary to many professions, and our calling is one of these. Even if it should do nothing more than engender a habit of close observation, its usefulness would be considerable enough. But its advantages are more positive, of more real value, besides the practical prosecution of it in fields and woods presents inducements for improving body and mind offered by no other science, except geology.

The following will be devoted to some hints for its profitable pursuit, and if some details of an apparently trivial nature occur, it should be remembered that it is just the knowledge of them which insures success, and the pleasure resulting from it.

Botany (derived from Boravy, the Greek word for herb), is a part of natural history, and gives us a knowledge of plants. One of its first aims is their determination. This necessitates a thorough mastery of botanical terminology. When this has been attained, Linne's system must be learned by heart, for its conciseness makes a knowledge of it to the student indispensable, and if he has only a number of plants and their names together, he will be convinced of its usefulness and convenience. Having overcome these first steps, we can at once proceed to their application. It may be here remarked, that what is called the natural system, is not very suitable to commence with, because it requires a certain facility of taking in at a glance the habitus of plants, i. e. their morphology and physiognomy, which is only acquired after some practice, and the more simple sexual system forms an admirable introduction to this. But how to proceed in determining a plant out of the immense number? This is the object of special botany, which describes every single species of plants, in a concise manner, by noting their distinguishing features and classifying them accordingly. This shows at once how necessary a scientific description is of all the plants of a country or locality, and the reason why the works of Prof. Asa Gray, of Cambridge, for instance, have been of inestimable value in the study of American botany. But the vast extent of our country leaves it still very desirable that we should possess descriptions of plants confined to a circumscribed locality, a "local flora;" so it would be of great advantage, for example, if we had a description of the flora of Cook county and environs of Chicago; we would become much more easily acquainted with our surrounding vegetation, and that which is not represented by it would be easily determined by the knowledge thus acquired. In determining, therefore, any plant, it is only necessary to apply our knowledge of terms, and the principles of the sexual or natural systems, and by the aid of one of these works on special botany, it will not be difficult to find its name and a minute description of it. If the first is commenced with, the parts of the flower and fruit must be closely investigated to determine the class; the leaves, stems, and roots, and other organs attached to them, furnish distinguishing features to determine the species; if the natural system is used, the main characters of its different natural orders must be studied. The more of these differences memory will retain, the more easy will it be to refer a plant to its proper genus.

But in order not to forget what has been learned of plants, it is necessary to gather and preserve them in a dried condition, to look over the collection now and then, for the purpose of refreshing one's memory. Such a collection is called an herbarium, and is of great value, when the plants have been properly handled during the process of drying, correctly determined and marked. "A good herbarium is better than all pictures: no botanist can do without it," says Linne.

The process of drying is simple; all that is required is a little care, and whatever else is needed can almost always be obtained at little expense. Two square, even and smoothly planed pine boards, a good size is 24x36 inches, or if that is not convenient 20x24, three or four reams of paper not strongly sized (old newspaper is excellent), and some heavy stones, is all that is necessary. If another set of boards is at hand, a larger number can be treated at once.

The plants are laid in according to their natural growth, between two single sheets of paper, these between the boards, and the stones on top of all. The upper board serves to equalize the pressure exerted by the stones. All flowers and some other easily deranged parts of plants must be underlaid by and covered with clean writing paper. This is necessary with blue, rose-colored and yellow flowers, which, being pressed between unsized paper, would, during the first days of drying, turn almost white, the yellow ones generally assuming a greenish appearance. By pressing the plants, their sap will exude; it is, therefore, advisable to interpose from six to twelve sheets of paper between them. This must be removed every morning and evening, and replaced by the same quantity of dry paper, for the first ten or fourteen days. During the third week one daily change is sufficient; afterwards a change every third day will be required till they are perfectly dry, which takes at an average from four to six weeks; in some cases much less, in others more time.

For the purpose of handling so many sheets of paper conveniently, and not to lose much time in finding the plants between them, it is advisable to fasten every ten half sheets in a whole one at the center of its width, about an inch from the edge, by means of a strong packing needle and twine, leaving the ends of the latter long enough to form a rather large loop for the purpose of hanging it up to dry.

In changing the paper the upper layer is cautiously removed, care being taken not to disturb the next plant below; the layer thus removed is immediately replaced by a dry one, and it, together with the plant and second wet layer, lifted off from the second plant, turned over so that the second layer comes uppermost; this is replaced again by a dry one, as in the first instance, the whole laid down upon the second plant, which, together with the third wet layer is lifted up from the third plant, turned over, replaced by a dry one as before, and so on through the pile. In this way all the wet paper is exchanged without disturbing the position of the plants.

In laying in plants the best way in general is to do it on the spot where they grow. For this purpose a portfolio with two or three quires of paper is necessary. After its habitus has been studied in situ, and notes taken, it is dug out or cut off and laid in, care being had not to disturb its natural growth and position. If the leaves are so numerous that they would overlap each other, pieces of writing paper must be interposed; no naturally recumbent or crooked parts dare be straightened, ascending or obliquely standing leaves, branches, &c., must not be pressed horizontal, &c. Plants, when being laid in, should not be moist by rain, dew, &c., or their green color will, during drying, turn black. Some succulent plants, and such as are of tenacious growth, have to be immersed for a minute in boiling hot water, or subjected several times to the pressure of a hot flat-iron (between layers of paper which must be as repeatedly changed), to kill their growth. In all cases their flowers must be excluded, for they refuse such treatment. It takes generally from two to four months to dry them completely. Again, the size of a great number of plants precludes their being laid in entire; of these, sections of their roots, stems, leaves, &c., are made, and subjected to the same general procedure. Those of a very delicate construction must be left under moderate pressure for a week, before an attempt is made to change the paper, and those parts of plants which produce a sticky juice must be sprinkled with lycopodium before being pressed at all, otherwise it would be impossible to remove them from the paper. The adhering powder can be easily blown off after they are perfectly dry.

For the purpose of exerting pressure, four or five stones, each of 30 to 40 pounds' weight, are enough for one pile. They must, if possible, be of nearly equal weight, and during the first four or five days three, and after ten or fourteen days the rest may be laid on. The presses used by bookbinders and others, especially constructed for the purpose, have been recommended, but all are objectionable for the reason that too great a pressure is applied too easily, with too little exertion, parts are crushed, sap extravasates, &c. No plants should be laid in without having all their parts investigated, and their name and position in the system correctly determined and marked.

(TO BE CONTINUED.)

## A SIMPLE, CONVENIENT, AND EFFICIENT MEANS OF PRESERVING VACCINE VIRUS.

[From the subjoined note from Dr. D. B. Hillis, of Keokuk, Iowa, it will be seen that the ready method of preserving vaccine crusts communicated by him for the PHARMACIST several years since, has proved a gratifying success.—ED. PHARMACIST.]

KEOKUK, Sept. 1, 1871.

TO THE EDITOR OF CHICAGO PHARMACIST—*Dear Sir:* In reply to your note of inquiry as to the efficiency of the plan of preserving vaccine virus between layers of the red rubber used by dentists, as detailed by me in No. 5, Vol. III, of your Journal, I state that for several years past I have used no new matter, but have, for the sake of experiment, drawn from the stock originally put up as described. I have always found it effective, though no care whatever has been taken as regards temperature. Last week I successfully vaccinated a patient from a crust which had been lying about my office in rubber for *twenty-seven* months. Respectfully,

D. B. HILLIS, M. D.

## EXCERPTA.

*Preparation of Diluted Phosphoric Acid.*—E. B. Shuttleworth (*Canadian Pharmaceutical Journal, Aug.* 1871), in commenting upon the preparation of acid, observes that the process of the U. S. P. is preferable to that of the B. P., particularly on account of its greater safety. In both nitric acid, in a very dilute form, is used, which oxidizes the phosphorus but slowly, prolonging the operation unnecessarily. The author finds nitric acid, having the specific gravity 1.24, preferable, as it expedites the process. With acid of this strength there is no danger of explosion or too rapid action, when the usual precautions are taken.

*Experiment Illustrating the Action of Dilute Sulphuric Acid upon Starch.*—A. Vogel says most kinds of writing paper contain so much starch that they are colored dark blue by solution of iodine. If such paper be written on with dilute sulphuric acid, dried and gently warmed, the starch is converted into dextrine. If now a solution of iodine is put on the paper will turn blue, with the exception of the places written on with the sulphuric acid.—*Amer. Chemist, from Berichte der Deut. Chem. Gesell.*

*Purification of Benzol.*—A. W. Hofmann: Benzol is frozen in a cylinder, in which a perforated piston moves air-tight, stirred from time to time, to prevent the formation of large crystals, and the piston removed after some time, when the fluid hydrocarbons will go through the perforations of the piston, upon which rests a snow-white column of benzol.—*Ibid.*

*New Chemical Toy.*—Dr. Puscher has published the recipe for a mixture that may serve as a substitute for the so-called "Pharaoh's Sepents." Mix intimately together 2 parts bichromate of potassa, 1 part nitrate of potassa, and 3 parts of white sugar. Press the mixture into tin foil cones, and if it is intended to keep it any length of time it must be preserved in air-tight packages. A small quantity of balsam of Peru may be added to perfume the mixture. The greenish colored, very porous mass, which assumes the serpent shape, is a mixture of carbonate of potassa, oxide of chromium, carbon, and a small quantity of neutral chromate of potassa. This mass is an excellent substance for polishing all kinds of metals, and, in fact, for fine work, this method might be originally employed in the manufacture of a polishing powder.—*Jour. Applied Chemistry.*

*Carbolic Acid Paper.*—This paper, now so much used for packing fresh meats, for the purpose of preventing them from spoiling, is made by melting five parts of stearine at a gentle heat, and then stirring in thoroughly two parts of carbolic acid, after which five parts of melted paraffine are to be added. The whole is to be well stirred together until it cools, after which it is melted and applied with a brush to the paper, in quires, in the same way as in preparing the waxed paper so much used in Europe for wrapping various articles.—*Ibid.*

*To Detect Adulteration of Aniline Colors with Sugar.*—Mr. Joly has ascertained that red aniline colors, such as fuchsin, rubin, &c., are frequently adulterated with great quantities of sugar, even to the amount of 50 per cent. On treating a sample of the suspected dyestuff with absolute alcohol, or, still better, with a mixture of alcohol and ether, the sugar will remain undissolved, and the amount of fraudulent admixture is thus shown.—*Ibid.*

*Tungstic Glue.*—This article bids fair to be an acceptable substitute for hard India rubber, now so high in price. It is prepared by mixing a thick solution of glue with tungstate of soda and hydrochloric acid, by which means a compound of glue and tungstic acid is precipitated, which, at a temperature of 85 to 104° F., is sufficiently elastic to admit of being drawn out into very thin sheets. On cooling, this mass becomes solid and brittle, and on being heated is again soft and plastic. This new compound, it is said, can be used for all the purposes to which hard rubber is adapted.

*Chloroform as a Means of Improving the Taste of Cod Liver Oil.*—According to Dr. Hager, the addition of ten drops of chloroform to

100 grammes of cod liver oil renders the fluid perfectly agreeable and palatable, without interfering with the therapeutical value of the oil.

"*Alaska Icebergs.*"—This unique addition to the show window, is commented on by correspondents of the *Druggists' Circular:* "Over a concentrated solution of nitrate of lead, contained in a globe, is poured a concentrated solution of chloride of ammonium; this must be done carefully, so that the two fluids do not mix, when the formation of the Alaska iceberg will commence."

*Another.*—"Alaska icebergs can be produced by making a saturated solution of plumbum nitras, then adding small, nice, white and long pieces of ammonium chloride, and exposing undisturbed to the direct light of the sun for several days. Upon examination you will find formed beautifully white, opaque, needle-shaped crystals of chloride of lead, representing the Alaska icebergs. The *rationale* is as follows: $PbONO_5 + NH_3HCl = PbCl$ (in crystals) $+ NH_4ONO_5$ (in solution)."

*Hæmatin*, or *hæmatosin*, is prepared as follows: Clotted blood is kneaded into a paste with the solution of some harmless coagulating salt, and is then subjected to a strong pressure. The cake thus obtained is taken out of the press, broken into crumbs, and digested with 97 parts of alcohol, and 3 parts of some acid. The hæmatosin dissolves in the liquid, which becomes strongly colored, and the "globuline" settles to the bottom of the vessel. The precipitate is poured off from the precipitate, and, on being neutralized, deposits a quantity of reddish flakes, which are raw hæmatosin. This is purified by successive washings on a filter with water, alcohol and ether, and is afterwards drained and reduced to a powder of a brown hue and metallic appearance, but with neither taste nor smell. After calcination, a residuum of oxide of iron is obtained. According to many physiologists, the iron exists in the blood in the form of protoxide, although German chemists think it exists there in its natural state. Hæmatosin, however, is administered in the shape of pills and lozenges in cases where iron is recommended, it being more easily absorbed by the stomach in conjunction with food.—*Medical and Surgical Reporter.*

*Preservation of Glass Vessels from Breakage by Hot Liquids.*—Mr. R. Simpson, *Am. Jour. Phar.*, states that a hot liquid may be poured into a cold bottle, or a cold liquid into a hot bottle, by slowly pouring the same down a metallic rod resting on the bottom of the bottle. This fact he has often verified, for several years. After a series of experiments, the author is "almost satisfied" that the effect is due simply to the absorption of heat by the rod. He uses rods of iron, copper or brass; and prefers one to be one-quarter inch in diameter, long enough to project six inches above the lip, which it is not to touch, while the liquid is poured so slowly that the rod shall carry it all to the bottom.—*Michigan University Journal.*

*Filtering Cones and Parchment Filters.*—In the *American Journal of Science*, for May, C. E. Munroe describes the use of these filters, for pressure filtration with Bunsen's pump They are simply very light earthen cones, having the angle of 60°, and are placed in glass funnels. That the air may not pass into the pump between the cone and funnel, a section of large seamless rubber tube is stretched over the funnel, so that a rim of the same, projecting above the top of the funnel, shall form a diaphragm border within the funnel edge, into which the porous cone closely fits. Sulphides of arsenic and antimony, [or organic substances] may be dried for weighing in these cones—the cone, if previously dried, not changing in weight. They may be used for filtering corrosive liquids or draining and drying crystals decomposed by paper. It seems desirable that these filters should be furnished by dealers in apparatus. Bunsen's pump is already being employed in pharmaceutical manufacture, both in filtration and percolation.—*Ibid.*

C. R. C. Tichborne, F.C.S., in the *Pharm. Journ. and Trans.*, states that suitable parchment paper is sufficiently previous for filtration into vacuum, and has the advantage of strength—still using Bunsen's platinum cone, however. He prepares it from Sweedish filtering paper, wetting one side in an ice-cold mixture of one part concentrated sulphuric acid and one-half part water, and washing quickly and thoroughly. Air is liable to pass between the parchment filter and funnel, unless a larger, inner filter of paper be used.

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# ON FERMENTATION.

BY PROFESSOR A. W. WILLIAMSON, F.R.S.

*Before the Society of Arts. Reprinted from the Pharmaceutical Journal, London.*

## Lecture IV.

We had occasion last week to notice the effect of the atmosphere on processes of fermentation in several instances. I mentioned, among other things bearing on that question, an experiment of Gay-Lussac, in which he squeezed some very ripe berries of the grape under mercury, and kept them, with due precautions for the exclusion, as far as he knew, of everything except the grape-juice; he kept this expressed juice for some time quiescent, and then introduced a bubble of air, or a bubble of oxygen, the active substance of air, but he subjected the the air or the oxygen, before introducing it into this juice, to various strong influences, which must have destroyed any vital organism in it; and he found that the mere addition of the air to the quiescent juice caused a process of fermentation to commence and a formation of organisms to begin, that they developed themselves, and that the liquid fermented in the usual way. The fact of the fermentation commencing is, if we bear in mind the general results of M. Pasteur's researches, to be attributed to the presence in the mercury or in the grape-juice, or somewhere or other in the substances present, of bodies which, by the mere access of oxygen, were stimulated so as to develope themselves into these little vital cells. It is now known, I may say, that there are in mercury, unless it is purified with extraordinary precautions, always present some such organisms, capable of developing themselves under such influences; and it is probable, I will not say more than that, for I do not know, that in the grape-juice there may also be similar germs present. The functions of oxygen appear from that experiment—which has since been confirmed by other observers—to be essential, at all events, to the initiation of the process, and there is, in that respect, a remarkable analogy, which I think is interesting to call to mind, with the action of oxygen on other bodies, as shown by an experiment made by Humboldt many years ago. He got some grains of wheat from Egyptian mummies, which had been so long at rest that they were not inclined to grow, in fact, they could not be got to grow in the ordinary way. However, he stimulated them to activity by immersing them in a little chlorine water. It is well known to chemists that chlorine in the presence of water does oxidize, or cause the oxygen to separate and pass over to common organic substances capable of combining with it. Humboldt actually stimulated these sleepy wheat grains to life, so that they grew and germinated, and their descendants are still in existence, by the mere action of oxygen developed in that way.

In the processes of wine-making and wine-keeping, the presence of air is one of the most important matters which have to be considered, and there has prevailed, and I ought to say there still prevails, to a certain extent, a difference of opinion regarding the functions of oxygen in these processes. On the one hand, it is known, as a matter of fact, that processes of fermentation are performed under conditions such as that air has access to the substance. No actual wine or beer-making has yet been performed on a large scale on such conditions as to exclude oxygen. On the other hand, the experiments of Gay-Lussac established clearly that it is necessary. In some cases, however, in wine-making, it has been thought desirable to facilitate the access of air to the substance; while other wine-makers think, on the contrary, that in the first process as little air should be present as possible; but there has always been some. The juice first expressed from the grapes has been very carefully examined with regard to the gases contained in it. If air has access to it, it is always necessary to know, in order to judge whether the air acts upon it, whether the air is dissolved by it, and whether, if dissolved by it, it is still to be found in the grape-juice as such, or whether it has undergone combination. Now, every case of the examination of must, or fresh grape-juice, which is not fermented, has shown that it contains a considerable quantity of gas, but no case has been established of free oxygen being present in it. Carbonic acid gas is present in it in a considerable quantity, and also nitrogen, in proof that air had had access to it, but the oxygen which was taken up at the same time with the nitrogen from the air, was not to be got out from that must again. It had been taken up, and it had entered into combination with the substance, so that all the oxygen present was actually combined chemically with it. In that respect a good many observations have been made by various chemists, but I ought especially to quote those of M. Pasteur, which are exceedingly careful and valuable. He has shown that this substance not only eats oxygen, but digests it. The oxygen is not to be found in it as such. It is only present in the form of a compound, which is formed by its action on the organic matters there present. Then, when the wine-juice has been expressed, and when it has been allowed to remain some time in a suitable place, so as to undergo fermentation, with a considerable variety of treatment in different places with regard to air, for in some places it is thought desirable that the fermentation should be allowed to take place in open vessels, or in vessels to which the air can have access as freely as possible, whereas in other cases special care is taken to cover as completely as possible the vessels in which the fermentation is taking place, so that the air may have as little access as possible to the fermenting substance,—and I believe it is impossible to give any one general rule with regard to the best process for all cases of fermentation, because the materials which are subjected to fermentation vary so considerably; they differ from one another in their composition so materially, and there are also other circumstances which are different,—for instance, the temperature, which has an important influence. Not only is the temperature in some localities higher than in others, but other circumstances are also different, and it would not be right to say, because air is found to be perfectly useless in some well-established cases during fermentation, that for that reason, it ought to be excluded, or even that it may be excluded, in all other cases of apparently similar fermentation. As far as a general rule can be laid down from present experience, I think it does appear certain that oxygen plays no part in the process after the first expression of the juice. Once the fermentation has commenced, it appears to go on as well if air is excluded from the substance as if air has access to it. There is, however, one circumstance which is considered by persons of considerable experience to be important in this matter, and which I ought therefore to mention, viz., that when fermentation takes place at a low temperature—and some fermentations are, with great care, kept at a low temperature—the products are found to be superior if the whole process is carried on, the temperature being kept exceedingly low, and in those cases it appears that an open vessel is certainly not in any degree detrimental. It is customary, in fact, to use an open tub when the temperature is low; and, on the contrary, it is usual to use a partially closed vessel, of course allowing for the escape of carbonic acid, when the temperature is comparatively high. When the first vinous fermentation has completed itself, it is customary, in the wine-growing countries, to put the still active liquid into casks, and the slower process of fermentation then goes on, which lasts a considerable time. During this second fermentation, there is very much the same kind of condition present as in the first, and there is always formed, in this subsequent fermentation, a considerable quantity of deposit, which is afterwards removed with much care; either the liquid is carefully decanted, or, in some cases, it is removed by a process of rough filtration. The subsequent treatment of the wine, I mean the keeping of it in casks or cellars, and the subsequent keeping in bottles—and these two processes of keeping it in casks and keeping it bottles are quite distinct,—are not usually considered as forming part of the process of wine-making. It appears, however, from the investigations of M. Pasteur, that changes take place in the composition and the materials by these processes, which really are as essential to the composition of the product as any other part of it, and that they ought to be considered as later parts of the process of wine-making. In fact, the process of wine-keeping is, in theory, not to be separated from the process of wine-making, the keeping being a process making it more perfect than it was when first turned out of the fermenting vessels. Common experience corroborates that in a very remarkable way. Everybody knows the difference there is between new and old wine, and the changes which take place when the wine is being kept constitute certainly one of the most important parts of the general subject of wine-making· Wine, when its fermentation has been completed, is found to absorb air with considerable rapidity and avidity, and when endeavours are made to get out from this wine again the air which has been dissolved in it, it is found that some kinds of wine allow it to go, or part with it again, whilst other wines do not; and in this respect, a distinctive test is found between the qualities of the wine; for by observing this difference in the facility with which they give up the air which they have dissolved, and by comparing that with the qualities of wines in each case, a remarkable generalization has been arrived at. In this matter I speak upon the authority of others, for I have not confirmed it by my own observations. But all that I do know fully corroborates it. The rule is this, that whereas low-class wines, which people will not pay much for, give up again almost completely the air which they have dissolved, superior kinds of wine do not give it up again, they only give up the nitrogen, and hold the oxygen fast. The oxygen, which is dissolved in both cases, is held firmly, or is digested by the high-class wines; but it is not digested, but simply eaten by low-class wines. Observations have been made in this direction by a great mady observers, especially Berthelot and Pasteur, to whom we owe most decisive results in this respect.

(*To be continued.*)

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# EDITORIAL.

## AMERICAN PHARMACEUTICAL ASSOCIATION.

The nineteenth annual meeting was held at St. Louis during the third week of September, and was quite largely attended, 115 members having enrolled themselves as present, from nearly all parts of the country. A commendable degree of interest was shown in the proceedings during the entire session, which lasted four days.

The meeting was honored by the presence of our good friend Henry B. Brady, of Newcastle-on-the-Tyne, President of the British Pharmaceutical Conference, and now an honorary member of this association. The active participation of Mr. Brady in the discussions added materially to the interest of the occasion.

Delegations were present representing the several colleges of pharmacy; also, the Canadian, New Jersey, and other local associations, and the alumni of three colleges. We dare to hope that the latter class of delegates will be dropped, as we feel that trouble will yet grow out of this double representation of certain colleges, it being manifestly unfair to all the other members of the association, that a local organization should have a double vote in committee, and wherever else a vote is taken by delegations. We also feel it to be necessary to notice the absence of the presiding officer, elected at the last meeting in Baltimore, and to call attention to the fact that a similar neglect of duty has been too frequent of late years.

The membership was largely increased at this meeting, 107 names being added to the list, which shows in a plain manner the advantage gained by meeting in the West this year. We notice with pleasure that the association is now free from debt, and is likely to continue so, owing to the wise financial changes made last year.

An invitation was extended to the International Pharmaceutical Congress to meet in Philadelphia in 1876, and a committee was appointed (to report in 1872), on arrangements necessary to be made. We hope this committee will not allow the invitation to drop, but will report in time, upon all matters connected therewith. The occasion may be made all that its advocates desire, but it must depend largely upon the exertions of those living in and near Philadelphia.

Fraternal greeting was sent by cable to the North German Apothecaries' Association, which convened simultaneously with our own, at Dresden.

We mention with much satisfaction the unusually large number, and the great merit, of the scientific papers read at this meeting. A very interesting relic of the 16th century was furnished by our honored member, Mr. Daniel Hanbury, F.R.S., of London, Eng., being a copy of instructions to the colonial government of Virginia, in relation to the exportation of indigenous drugs. Dr. E. R. Squibb furnished his usual quota of valuable information, although detained at home, much to our regret, by pressing causes. We hope the able report of Mr. Remington on adulterations will be read by all who did not hear it, and that a similar report will be forthcoming annually so long as cause for it shall exist; it will be of great value to many, and drive many a rascal to his hole. After the shameful neglect of last year, we were gratified in having an excellent report on the drug market, by John McKesson, Jr. This subject being an important one to druggists, we hope the reporter (Mr. McKesson) will continue his valuable labors now so well begun.

A delegation from the University of Michigan presented itself for admission as representing a college of pharmacy. It being shown that the University confers the degree of "Pharmaceutical Chemist" upon young men who have had no experience whatever in the drug business, and who, consequently, have no knowledge fitting them for such a title, the application was rejected. We hope that our sister institution will hereafter conform to the well matured system of the colleges of pharmacy, either by changing the title of graduation or by requiring a proper qualification before conferring it.

The exhibition of chemical and other specimens was quite large, and well arranged in a beautiful upper hall. We have not space to enumerate the articles nor the exhibitors, but may refer to the subject another time. Great praise is due to the local secretary, Mr. Wm. H. Crawford, and to those who aided him in his arduous duties. These exhibitions have become an interesting and a valuable feature of the meetings; they should be considered as second only in interest to the scientific papers read; and, if properly conducted, will become a means of education to those present, while their value in a commercial sense should not be overlooked. In this connection, we feel called upon to say that, having seen for the first, we hope it may be the last time, the exhibition of liquors as a beverage, it being foreign to the objects, and detrimental to the morals, of the association.

The druggists and chemists of St. Louis deserve, and are tendered, our warmest thanks for their generous hospitality. We would especially mention the care and attention bestowed upon the wives of visiting members. On Tuesday evening a reception was given in the parlors of the Southern Hotel, at which a collation was served, after which a stag party assembled, which, with toasts and speeches, became confused as to the orderly motion of the planetary system. On Wednesday the ladies were escorted in carriages to the prominent points of interest in the city. On Thursday evening a banquet was given to the members at the Southern Hotel, in which 300 persons participated. The arrangements were upon a grand scale, and were generally enjoyed by those present, toasts and speeches being a feature of the entertainment. On Friday afternoon the visiting members and their wives were shown the various objects of interest in the city and its suburbs, visiting the wine cellars of the American Wine Company, Shaw's very extensive and beautiful botanical garden, the parks and public buildings. Thus this very interesting and pleasant meeting closed, leaving in the minds of all, pleasant recollections of the Mound City and its generous apothecaries.

The pleasure and the value of these meetings can only be appreciated by being enjoyed, and we would earnestly recommend to all the members participation in each annual reunion. The benefits to be derived can hardly be estimated, while the social and friendly relations established constitute a source of pleasant reminiscence in the otherwise arduous and confined life of the pharmacist. We trust the meeting at Cleveland will be largely attended and enjoyed by those who have not hitherto met with us, when they will be sure to receive a hearty fraternal greeting.

## THE NEW YORK DRUG LAW.

The druggists of New York City continue to be greatly exercised over their new drug law. There seems to be no exception to the disapprobation expressed. The most scientific and experienced of the profession are the bitterest in their denunciations of it. There seems to be no doubt that the real object of the law is plunder—to afford to a few pets of notorious political rings a chance to levy an unusual and exorbitant tax upon pharmacists. We adverted, in our last number, to the main features of this odious law. The fee charged for certificates is unwarrantable. There can be no justification for any fee above what would cover the expense of the examination and the certificate issued. But one practical pharmacist is placed on the board.

In Rhode Island the entire fee for examination and certificate is $10. In the city of Baltimore it is $5. The latter fee is undoubtedly sufficient to secure the end in view. The idea that an additional dignity attaches to a certificate when the fee is made extortionate, is simply absurd. Of course every established druggist in New York is forced to take out a certificate, since he cannot well afford to retire from his profession to escape this extortion. This law, by discriminating unjustly against druggists as compared to those in other avocations, is one of the most remarkable acts of special legislation that has ever been enacted. The value of the certificate emanating from this board, outside of New York, would be almost nothing. The two physicians and one chemist (R. Ogden Doremus) on the board of commissioners are distasteful to druggists, since it is an intimation that the profession of pharmacy cannot present among its own members a sufficiently capable board to pass upon the merits of candidates.

Were a board of pharmacists selected to pass judgment upon medical qualifications, there would doubtless be a great outcry. We have no objection to a reasonable and practical law, such as that proposed through the pharmacists of Chicago, which was published in our March number. The operation of the new law in New York is unjustifiably confined to New York city. Why are its provisions not enforced throughout the State? If the law is to inure to the public good, it should be universal. Disguise it how they may, the main object of the law is to afford more fat offices to a few political barnacles.

Again, let us hope that the legislature of Illinois will be at once memorialized by pharmacists to enact a suitable law adapted in its provisions for the State at large. We should have a law which embraces just such practical features as are embodied in the Pharmacy Act drafted in February last by the druggists of Chicago.

## MINUTES OF THE SEMI-ANNUAL MEETING OF THE CHICAGO COLLEGE OF PHARMACY, HELD SEPT. 6, 1871.

The meeting was called to order by the President, Mr. E. H. Sargent, at three o'clock p.m. In the absence of the Secretary, Mr. Bartlett was appointed secretary *pro tem.* On motion, the reading of the minutes of the previous meeting was dispensed with.

The Chairman of the Business Committee recommended the appointment of a committee on "Drug law," and also the appointment of delegates to the meeting of the American Pharmaceutical Association, to be held on the 12th inst. After an extended discussion, the President was authorized to appoint a committee of three to take into consideration the subject of pharmaceutical legislation; to review, and, if necessary, revise the law recently proposed by druggists of this city, and to suggest means for securing its enactment during the session of the legislature in Chicago. The President was allowed time in which to select a suitable committee.

The following were nominated and elected delegates, with power to fill vacancies, to the meeting of the A. P. A.: Messrs. T. H. Patterson, Geo. Buck, N. Pierpoint, Geo. M. Hambright, and Albert E. Ebert.

On motion, Messrs. Sargent, Ebert, and Hambright were appointed to represent the Chicago College at the annual Convention of Colleges of Pharmacy.

On motion, the President was authorized to appoint a librarian, to have general supervision of the library; to keep the keys in an accessible location, and furnish them on application to members of the college. The librarian to serve without compensation.

On motion to adjourn, adjourned.

N. Gray Bartlett, *Secretary pro tem.*

## THE LATE DR. WM. T. G. MORTON.

We are in receipt of a pamphlet entitled, "Historical Memoranda relative to the Discovery of Etherization." It was prepared by a committee of citizens of Boston, chosen to raise a Morton testimonial fund.

The evidence that Dr. Morton was the first to practice anæsthesia by etherization, and to introduce its use in modern surgery, is undoubted, whoever may have first suggested the idea. It has been unfortunate for Dr. M. that Dr. C. T. Jackson is also a Bostonian—well known and of high repute in that community as a scientist. Dr. J. has been also known to be as full of ideas as an egg is of meat. His claim of having originated the idea of the electric telegraph, and to have indoctrinated Prof. Morse with his views is well known. Dr. C. T. J. should be contented with the reflection that—having practised this large and liberal manner of scattering seed—it fell in proper places, and has resulted in the most marvelous fruition.

Dr. Morton, unfortunately, during the last years of his life, soiled some of his dearly earned laurels by personally urging his claims to pecuniary consideration at the hands of the medical profession. The languid feeling which actuated the ordinary Boston intellect on the rival claims of her two citizens, was well expressed by a bad pun some time since. A Boston man of taste having been appealed to for an appropriate motto for a *joint* monument to Morton and Jackson, replied—*either*.

We heartily sympathize with this movement to secure for the impoverished family of Dr. M. a testimonial fund as a tardy recognition of one of the greatest discoveries of modern times.

In New York City the fees for druggists' certificates have been fixed as follows: Druggists and drug clerks, $30; prescription clerks, $10. The number of licenses and probable amount of fees is estimated thus:

| | |
|---|---|
| Druggists, 438 licenses | $13,149 |
| Drug clerks, 114 licenses | 3,420 |
| Prescription clerks, 657 licenses | 6,570 |
| Fees for diplomas, etc. | 067 |
| | $23,197 |

The Board of Supervisors has fixed the salary of each member of the Examining Board at $2,500, and the salary of the secretary (an appointee of the Examining Board), $2,000 per annum.

## BIBLIOGRAPHICAL.

THE MODERN OPERATION FOR CATARACT. A Lecture delivered before the Harvard Medical School. By HASKET DERBY, M.D. April, 1871.

This lecture, by the distinguished Boston oculist, is devoted to a description of the final method of cataract extraction practised by the greatest of modern ophthalmologists, Prof. Von Graefe—styled by him "peripheric linear extraction,"—the section being made, not through the cornea, as in preceding plans, but through the line of junction of this membrane with the sclerotic, and in a direction parallel with that line.

This operation, which, in the hands of Graefe, increased the percentage of success in cataract operations to ninety-four, is in this essay thoroughly and clearly described, the peculiar features of each step of the procedure being given with the precision which comes of earnest consideration, minute and intelligent observation, and extended experience.

The appendix, containing an analysis of sixty-one cases operated upon by Dr. Derby, is a valuable contribution to the literature of the subject. It is worthy of especial notice that in the after treatment, Dr. Derby, in imitation of Prof. Von Graefe, antagonises an excessive reaction by venesection—one other intimation that in the matter of blood-letting the world may have an additional illustration of the error of the aphorism, that "Revolutions never go backward."

WE overlooked the word of welcome which we had in our hearts for the Detroit *Review of Medicine and Pharmacy*, Geo. P. Andrews, Editor and Proprietor, Detroit, Mich. Among the original articles in the July issue, is a very able and exhaustive paper on "The Magnetic Condition of Mineral Wells," by Prof. R. C. Kedzie.

The magnetic waters of Michigan—over which there has been so much cheap newspaper rhapsody during the past year, and which every one belonging to the true chemical guild has noticed with the incredulous smile so provoking to ardent imaginations—have received an estoppel in Dr. K.'s paper.

The proprietors of these springs must look to some other source for the remedial virtues of these famous waters than magnetism. The real origin of the magnetism discovered through the crude experiments of dabbling knife-blades and needles into the water, as it gushes from the iron tubing of these wells, is undoubtedly, as Dr. K. proves, derived from the iron tubing itself—which, placed vertically in the earth, is, by virtue of its position, a magnet of considerable power, and is capable of magnetizing an indefinite number of knives and needles.

We have been repeatedly consulted concerning magnetic phenomena observed in the iron fronts of buildings, iron water spouts, railings, &c. Such magnetism is undoubtedly induced in iron by being placed at right angles to, or perpendicular to, the magnetic currents of the earth. It was well known to us in our boyhood, that the tongs, which invariably stood in the corner of the fire-place, were a reservoir of magnetism sufficient to charge a pocket knife with its virtues. The people of Michigan must find some other charm in their numerous swamps, lakes and springs, to draw immigration, than this suppositious magnetism over which they have been so exultant.

We welcome again among the new competitors for public favor in the department of journalism, *The Medical World*, Reuben Vance, M.D., Editor. New York city.

*The Half-Yearly Abstract of Medical Science*, for July, 1871, is an interesting compend of the progress of medicine and pharmacy for the past season. In the department of forensic medicine we note some excellent observations upon the use of hydrate of chloral.

Two cases of poisoning from thirty grain doses of this drug are reported, one of which proved fatal. The symptoms in the two cases did not exactly correspond. In both cases, however, there was collapse through arrested action of the heart. In the department of therapeutics there are some excellent observations upon the use and abuse of hydrate of chloral, in the papers of Dr. Richardson and Prof. Skoda. The use of this drug, though declining in the profession, is largely on the increase among the unprofessional. Its popular use among the intemperate is very considerable for controlling alcoholic mania and wakefulness. A remarkable feature of this drug is indicated in an indisposition of the system to accommodate itself to its use, as it does with narcotics.

The use of glycerine extracts of pepsine is highly commended. Glycerine dissolves and effectually preserves this substance, in no manner impairing its properties.

*The Half-Yearly Compendium of Medical Science*, for July, contains some interesting observations in the department of physiology. In the department of chemistry, the contents are meagre and of little interest. In toxicology an interesting case of poisoning by gelseminum is reported by Jas. G. Pinkham, M.D., Lynn, Mass. Symptoms, unconsciousness, stertorous breathing, livid paleness, mouth wide open, eyelids partially closed, motionless, pupils slightly dilated, pulse 100, regular, weak; half-consciousness returned in an hour by the aid of friction and stimulants. Recovery was not complete for several days. Symptoms —great prostration and muscular weakness, particularly marked in the elevator muscles of lower jaw, eyelids and the arms. The amount of dose given uncertain, as it had been prescribed by a quack.

A case of poisoning is reported by the absorption of carbolic acid, by Dr. W. W. White, of Springfield, Mass. The patient was under treatment for fracture of the thigh. There was also an extensive necrosed surface of the tibia, upon which the patient had been for some time in the habit of using carbolic acid to correct sanious discharges, hitherto without any unpleasant consequences. Soon after removing the splints and bandages above, an opportunity arose for rapid absorption, at least, alarming symptoms set in very soon. The symptoms did not differ greatly from those attendant on pyæmic absorbtion. The odor of carbolic acid in the urine on the next day pointed to the undoubted absorbtion of this drug. However,. it seems to us unwarranted to attribute the symptoms to carbolic acid, under the circumstances.

Prof. J. Long Cassels, of Cleveland Medical College, makes some alarming statements as to the poisonous effects of zinc upon water, through the use of galvanized iron, etc. Although zinc milk pans *may* be very unwholesome through the reaction of lactic acid on zinc, we still adhere to our confidence in the general wholesomeness of zinc for sinks, water pipes, and tanks, if used with care.

Our attention is directed to a short paper, entitled "A Review of Darwin's Theory of the Origin and Development of man." By Jas. B. Hunter, M.D. This paper is a simple summary of Dr. Darwin's views. The impression is conveyed of a qualified acceptance of Dr. Darwin's views by the writer.

To the philosophic mind this hypothesis is one of the most remarkable speculations of modern times. It claims a foundation in nature, but it must be steadily held in mind that the facts upon which the theory is based are outside of nature, *i. e.*, they are derived from the variations of animals and plants when removed from their natural relations, or in domestication. As a theory, natural selection strikes at our belief in the absolute perfection of organic forms either in general or detail. Any variation in nature which can insure advantage implies, of course, a primordial imperfection or disadvantage. Moreover, these advantages, according to the theory, arise casually, *i. e.*, out of many variations spontaneously arising, some one is found advantageous, and in time, through increased progeny, inheriting the modification, the parent form is supplanted.

The essential impiety of Darwinism lies in denying the universal perfection of nature. What rational mind can suppose for an instant that casual variations arising in the struggle for existence could lead to the elaboration of a substance like quinia in the cinchona plant. This substance established important human relations between a plant in a dense tropical forest ages ago and the highest human civilization in a distant zone. According to this theory we must suppose that the casual exigences arising in the simple struggle for existence anticipated the whole science of chemistry and medicine.

Dr. Darwin gloats over the gradual supposed co-adaptation of the nectary of a flower with the proboscis of a butterfly, but what has he to say of just as perfect adaptations of a plant to human interests ages removed and at the antipodes of the earth? Just such distant relations and interdependences in the organic world are everywhere met with. They afford convincing evidences of design in creation, and are as perfectly fulfilled as those which adapt a species to its immediate surroundings.

We must not overlook the fact that species in nature are essentially invariable. Indeed, this forms our elemental idea of species. Geology finds them absolutely uniform for untold ages.

The manifold analogies which pervade the animal and vegetable world, linking the varied forms into groups and sub-groups, no more point to community of descent than do similar analogies of form and structure among the inorganic elements. A philosophy of development founded on just such analogies in the inorganic world led to all the vagaries of alchemy. The growth of the embryo which appears to repeat the several orders of the animal kingdom has the same insignificance. Nature adheres rigidly to a certain simplicity of plan in structure. She introduces no new principles of structure unnecessarily. This is just as true in the world of physics as in the realms of life. The principle of lever pervades the mechanical powers. In chemistry, an acid and a base are indefinitely repeated. The theory of Darwin, then, as an attempt to explain creation is a failure. It is very ingenious as founded upon the known variations of animals and plants in domestication. If animals and plants are given into man's hands to experiment with, we must expect that he would induce effects unknown in nature as much so as are many of the products elaborated by the chemist. Man's labors are anticipated by nature in her laws, but he often produces effects which are not found in nature.

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## THE LIBRARY OF THE CHICAGO COLLEGE OF PHARMACY.

The trustees of the college are determined to allow every reasonable facility of access to the library of the institution, as will be seen by the appended resolutions, adopted September 27th, 1871.

The privileges of the library are not restricted to members of the college, as all druggists and their assistants are cordially invited to visit the rooms, and consult any or all of the many valuable works of reference now upon the shelves.

We would also call attention to the fact that the lectures of the college are free to all of its members.

*Resolved*, That a librarian, and an assistant librarian, be appointed by the President of the college, at a suitable compensation.

*Resolved*, That the rooms of the college be kept open between the hours of two and five P. M., on Mondays, Wednesdays, and Fridays, and from seven P. M. to nine P. M., on Thursdays, commencing October 2d, 1871, and continuing during the lecture season.

*Resolved*, That all druggists and their assistants be, and are hereby, cordially invited to avail themselves of the privileges of the library, at the above mentioned times.

THE PHARMACIST.

AND

CHEMICAL RECORD.

VOL. IV. CHICAGO, NOVEMBER-DECEMBER, 1871. No. 11-12.

# SENEKA.

BY R. ROTHER.

Polygalic acid the active agency of seneka root is invariably accompanied by another peculiar body termed virgineic acid. When seneka root is treated with water the polygalic acid alone dissolves. But when alcohol is employed as the solvent both the polygalic and virgineic acids are extracted. If the aqueous infusion is now condensed and the syrupy residue treated with alcohol the polygalic acid is precipitated. Pure polygalic acid is therefore insoluble in alcohol. If now the alcoholic tincture of seneka is concentrated to a syrupy liquid by evaporating the alcohol and then water be added the virgineic acid precipitates whilst the polygalic acid remains in solution.

Virgineic acid either alone or associated with polygalic acid is therefore insoluble in water. Now since polygalic acid is readily dissolved by alcohol only in the presence of virgineic acid it becomes evident that the latter determines the solubility in that menstruum.

Pectin and albumin are two inert constituents of seneka root which by reason of their proneness to decompose must always be avoided in its preparations. Both are soluble in water and weak alcohol.

Consequently if officinal alcohol is used as the menstruum for exhausting the activity of seneka root, these injurious bodies will be totally excluded from the preparation.

It would now seem that with the use of officinal alcohol all difficulty had been overcome, but the residuary mixture of polygalic and virgineic acid after the expulsion of the alcohol forms by the addition of water an opaque intensely milky mixture owing to the finely divided state of the insoluble virgineic acid. Although virgineic acid is insoluble in cold water, it nevertheless dissolves quite freely in this when hot yet again separates on cooling in more compact creamy flakes, whilst the intervening liquid seems transparent and clear. The milky liquid at first obtained passes readily through a filter, but unaltered in appearance. However the same liquid after, being heated and again cooled utterly defies filtration, as the impervious precipitate rapidly fills the pores of the paper.

Since the active ingredients of seneka possess acid characters, they will naturally combine with some bases, for instance, the alkalies. This is unquestionably true in case of virgineic acid as it is instantly dissolved by ammonia, potassium or sodium hydrate or their normal carbonates, and is immediately reprecipitated by the addition of an acid.

Acting upon the circumstance that the annoying presence of virgineic acid can be tolerated by the intervention of a base, the writer about two years ago, devised a process for syrup of seneka and compound syrup of squill which rested upon the application of officinal alcohol and ammonia.

Disodic carbonate would have formed a more stable combination, but it was rendered wholly objectionable by the fact that many acidulous preparations as syrup of squill for example, so frequently used in conjunction with these syrups was rendered entirely incompatible by the antagonism of the acid in one and carbonated alkali in the other.

Ammonia was therefore adopted, but a similar objection in regard to acid preparations ruled here since the virgineic acid was invariably liberated. Even after the beautiful and clear syrup had been prepared a few days, the affinity between the ammonia and virgineic acid relaxed and the latter again floated free. Upon this the writer resorted to the use of magnesium carbonate to clarify the milky mixture of polygalic and virgineic acid, a precedent already given in other syrups. This was attended with good success, and the process was published.

In the process given the writer adhered to the excellent menstruum, the official alcohol which so readily exhausts the activity and so thoroughly excludes the inert fermentable matters, but merely replaced the caustic alkali by magnesium carbonate which by mechanical absorption *removed* the virgineic acid. To economize menstruum the writer recommended repercolation, but a single percolation with more menstruum was optional. Subsequently, this process however excellent, was abandoned for a simpler and more expeditious one.

Syrups are aqueous preparations containing sugar as a preservative of certain substances in the administration of which alcohol is sought to be avoided. Yet, nevertheless, in the majority of these preparations the absence of alcohol in a therapeutic view is not absolutely required. But its presence in a pharmaceutic one is often indispensable to the permanence of such preparation where sugar alone fails to preserve. It is, therefore, the opinion of the writer, that in syrups where the sugar alone suffices alcohol should not enter, but wherever it is required no scruples should be entertained against its presence.

In the new modification a great difficulty is obviated by using the root in coarse powder. The objection to this procedure is again compensated by a short maceration before the root is packed and percolated. A very weak alcoholic menstruum is used, about $\frac{1}{6}$ to $\frac{1}{4}$ alcohol; the percolate is slowly heated to boiling, the albumin precipitated and considerable of the alcohol is expelled, enough, however, remains for the purpose intended; after cooling the liquid is filtered; this proceeds rapidly, the filtrate being perfectly clear and transparent. The sugar is now dissolved in this by heat and the syrup strained through muslin while hot. Less sugar than usual is taken and still the syrup is thick, permanent, clear and transparent, and possess the peculiar sparkling brightness imparted to syrup by alcohol in a high degree.

Syrup of seneka is prepared as follows:

Take of seneka root in No. 24 powder, 8 troy ounces.
Sugar 32 troy ounces.
Alcohol.
Water of each sufficient.

Mix one part of alcohol with 3 of water, pour 8 fluid ounces of this on the seneka macerate 24 hours, and pack moderately firm in a cylindrical percolator forming a column of medium height; then pour on the menstruum until 2 pints of percolate has passed, heat this slowly to boiling, maintain the temperature 10 to 15 minutes, evaporate to 22 fluid ounces, let cool, and filter, then add the sugar, apply heat until this has dissolved and strain through muslin while hot. The product measures 2½ pints.

## SQUILL.

BY R. ROTHER.

The body called scillitin is the supposed active principle of squill; it possesses an alkaloidal character and combines with acids. In the native state it is soluble in alcohol and water, but the prodigious quantity of gum contained in the root and enveloping the principle renders strong alcohol inadmissible as a menstruum; water or weak alcohol is therefore the only available means by which the activity of the root can be perfectly exhausted. This menstruum dissolve the gum and with it the alkaloid. Hence any menstruum which does not completely dissolve the gum fails to extract the virtue of the root. The excessively large proportion of gum has always been an obstacle in the way of a concentrated preparation of squill, as also in the weaker aqueous preparations by reason of its fermentable quality. However the acidulated preparations as the vinegar and syrup of squill are perfectly stable, If squill be macerated with water a few days especially in a warm locality or during the summer weather the infusion becomes sour. Gum under the combined action of diluted acids and prolonged heat is converted into glucose. When the sour infusion is evaporated the acid converts the gum more or less completely into glucose according to the duration of the action. Now if alcohol be added to the concentrated syrupy residue, which during the process has acquired a dark brown color and sweet taste, very little if any gum will be precipitated whilst the sugar dissolves. A precisely similar result is obtained by the introduction of acetic or sulphuric acid in the beginning. An alcoholic menstruum yet containing sufficient water to dissolve the gum readily yields invariably a light colored residue consisting of gum free from glucose since the presence of alcohol has prevented the formation of acidity in the dilute infusion. This residue when treated with strong alcohol is converted into a doughy magma of an utterly unmanageable nature. Therefore to produce a concentrated preparation of squill as fluid extract, for instance, it becomes indispensably necessary to convert the greater part of the gum into glucose in order to admit the presence of sufficient alcohol in the concentrated liquid to preserve it. The supposition would now seem valid that the volatile acetic acid above all others would meet the indications. But this is not realized in practice, the requisite heat to expel all the acid remaining in the concentrated residue is destructive to the product. Sulphuric acid is more adaptable to the case as this can be easily and completely removed with calcium carbonate. With sulphuric acid the concentration must not be carried so far as to cause injury through the instrumentality of the acid itself as this would char the syrupy residue were it evaporated to the same extent as the acetic solution; it is therefore neutralized before even a very decided brown coloration has been imparted to the dilute liquor. The generated calcium sulphate together with the excess of calcium carbonate is removed by filtration, the filtrate carefully evaporated to the necessary limit and then mixed with the required amount of alcohol. Acetic acid could be used as well and even to advantage if no objection be raised against the presence of the resulting acetate formed by neutralizing the acid with any desirable base after its catalytic action is no longer needed. When operating upon squill it is always desirable to leave it in as coarse a condition as possible. The sliced root is often best; No. 12 powder is very convenient, and for purposes of extraction none should be finer than No. 20.

No preparation of squill should ever be made from the fluid extract.

Vinegar of squill is best produced from the sliced root by maceration, an insufficiency of water is first used with all of the acetic acid intended for the finished product, after due maceration the liquid is separated by means of a press, measured; and then as much water as will be necessary to complete the whole measure of the finished preparation added to the residue; after a short maceration this is also pressed out the whole mixed together and filtered.

Syrup of squill should never be made by heat as it is invariably clouded with flocculent matter which has separated during the process. A bright and beautifully clear syrup will always be obtained when the sugar is dissolved in the vinegar of squill without heat. This is accomplished by first filtering the vinegar if necessary, pouring part of it upon the sugar to cause this to crumble then adding the remainder, agitating frequently until the sugar is dissolved, and finally straining through muslin. The straining of cold syrups is best performed by placing a large square sheet of muslin upon a proportionately large funnel, then pouring on the syrup until the funnel is filled; by now folding any two opposite sides of the strainer together and twisting the ends in contrary directions, the syrup is rapidly forced through.

Compound syrup of squill can only be rendered permanent by the intervention of a small proportion of alcohol.

The seneka and squill entering into its composition can best be exhausted with a weak alcoholic menstruum. A portion of the alcohol should be expelled, and the dissolved albumin coagulated by slowly heating to the boiling point, filtering after cooling, and dissolving the sugar and antimonial tartrate in the filtrate with heat. The process yields a product which meets every requirement, and is executed as follows:

Take of Seneka root in No. 20 powder.
Squill " " " " of each 8 troy ounces.
Sugar 76½ troy ounces.
Antimonio-potassic tartrate 96 grains.
Alcohol.
Water of each sufficient.

Mix one measure of officinal alcohol and 3 of water, pour 3 pints of this mixture upon the powdered roots and let macerate for 24 hours. Now place this into a cylindrical percolator forming a moderately low column, and pour on more of the menstruum until 4 or 5 pints of percolate has slowly passed; heat this slowly to the boiling point and then evaporate to 3½ pints, let cool, filter and in the filtrate dissolve the sugar and antimonial tartrate with heat, and strain through muslin while hot; the product measures 6 pints.

Fluid extract of squill is sometimes prescribed, and it is advisable for the pharmaceutist to prepare it himself and always have some on hand. For this purpose either the sliced root or the No. 12 powder can be used. The sliced root is treated by maceration, and the powder is percolated. The process with powder is as follows:

| | |
|---|---|
| Take of Squill, in No. 12 powder - - - | 16 troy ounces. |
| Sulphuric Acid - - - | 1 troy ounce. |
| Calcium Carbonate - - - | Sufficient. |
| Alcohol - - - - - - | 4 fluid ounces. |
| Water - - - - | Sufficient. |

Mix the sulphuric acid with 3 pints of water; pour the mixture upon the squill and let it macerate several days. Now place it into a cylindrical percolator, forming a low column, and pour on water until 4 pints of percolate has passed; evaporate this to 2 pints with boiling, and while hot add calcium carbonate in slight excess; filter; wash the residue in the filter with a small quantity of water; evaporate the whole filtrate to twelve fluid ounces, and then slowly pour in the alcohol with constant stirring, and strain through muslin.

## LICORICE.

BY R. ROTHER.

The ordinary commercial licorice, whether in sticks or powder, is always a very impure substance. The average real soluble extract contained in it exceeds not 50 per cent., and is usually so deteriorated in the process of extraction that it is but a very feeble representative of the crude root. The glucoside glycyrrhizin is the representative element of the root. Like the glucosides in general it possesses acid properties, and combines with bases. In licorice root the greater part is combined with ammonia, forming a very soluble salt, decomposable by acids with separation of glycyrrhizin, which is sparingly soluble in water, but readily soluble in alcohol. This, when subjected to the action of diluted acids, at elevated temperatures, is, similarly to all glucosides, under the same influence, split up into another compound and glucose.

The licorice of commerce is mostly derived from Spain and Italy. There it is obtained by the crude process of boiling the albuminous and starchy root with water, and boiling down the infusion in copper vessels to the required consistence. Other inert substances are frequently incorporated with a view to adulterate or give it firmness. If the infusion, during the process, becomes sour, the glycyrrhizin separates, and eventually suffers decomposition by the action of the acid.

Licorice is much used in medicine, and although medicinally of little importance, yet, however, it is the desire of the pharmaceutist to furnish this as well as all other pharmaceutical products, of the best attainable quality. Commercial licorice always has an acrid, unpleasant taste, entirely distinct from the peculiar and pleasant flavor of the root Pharmaceutically, therefore, the crude licorice should never be used. In Europe it is purified for medicinal purposes, by exhausting the crude article with cold water and evaporating the solution to the proper consistence, which may be in three forms, namely: in powder, pilular extract, and syrupy liquid. The purified preparations obtained from crude licorice, however, possess its dark color and bad flavor. The insoluble matters were simply removed; otherwise it is no better than at first; even during this operation more of the glycyrrhizin may have been decomposed.

It was found that licorice root, when exhausted with cold water and the infusion carefully evaporated to dryness, yielded 20 to 25 per cent. of light brown extract, having the original flavor of the root, equal to 30 or 35 per cent. of pilular extract, or 50 per cent. of syrupy liquid.

The liquid preparations of licorice or licorice root are mostly aqueous or syrupy, and in a dilute condition will not keep without the addition of preservatives. These must either be alcohol, glycerin, or saline substances. The writer, however, discards the first two for this purpose in the three preparations of licorice root about to be noticed. These are liquid extract of licorice root, syrup of licorice root, and compound syrup of licorice root. Owing to the invariably inferior quality of crude extract of licorice root, it is the opinion of the writer that pharmaceutists should make all the preparations of the so-called licorice directly from the root. This is farther supported by the facility with which they can be obtained from this source. In these processes the writer aids the extraction of all the glycyrrhizin by the addition of more ammonia.. The liquid extract of licorice root, when made of the concentration above stated, is very permanent, and will keep almost any length of time in all seasons of the year. It is a purely aqueous solution of pure extract of licorice root, intended for dispensing purposes, and the extemporaneous preparation of simple syrup of licorice root. This latter will not keep long, and must always be made fresh as demanded. Compound syrup of licorice root is a permanent syrup, of the same strength as the simple syrup, and contains ammonium chloride, which preserves it. This combination is a very popular cough remedy, long and favorably known as Hufland's German Cough Mixture.

Liquid extract of licorice root is prepared by exhausting the root in coarse powder by means of percolation with a menstruum, consisting of alcohol $\frac{1}{4}$ or $\frac{1}{6}$, and water $\frac{3}{4}$ or $\frac{5}{6}$, with about 2 fluid drachms of 16 or 18 per cent. ammonia water in each pint of the mixture. The percolate is heated to boiling to precipitate the dissolved albumin, and filtered hot; the residue on the filter is washed with hot water and the filtrate evaporated to half the weight of the root employed. The process may further be stated as follows:

Take of licorice root in No. 20 or 24 powder, 32 troy ounces.
Alcohol one pint.
Water sufficient.
Water of ammonia (16 or 18 per cent.) 1½ fluid ounces.

Mix the alcohol with 5 pints of water and add the ammonia. Moisten the powder with 6 fluid ounces of the mixture, pack firmly in a cylindrical percolator forming a column of medium height, and pour on the remainder of the mixture, and then water until 6 pints of percolate has passed; heat this to the boiling point and filter; when the liquid has disappeared from the surface mix the residue with a pint of water; heat and filter; mix the filtrates and evaporate the liquid carefully until it weighs 16 troy ounces.

Syrup of licorice root is prepared as follows:

Take of liquid extract of licorice root one drachm.
Syrup sufficient to make one fluid ounce. Mix.

To make compound syrup of licorice root the writer's first process consisted in exhausting the root with water by percolation, boiling the percolate, filtering, evaporating the excess of liquid, dissolving the ammonium chloride and sugar in the residuary liquid with heat, and straining whilst hot.

This method, however, was found too circumstantial, The root was then treated by repercolation with water, and also with water containing some of the ammonium choride. To the strong percolate the ammonium chloride was then added, the quantity used forms a nearly saturated solution of the salt. This at once produces a dense resinous precipitate which rapidly subsides as a heavy tenacious mass, insoluble in water but rapidly soluble in ammonia or disodic carbonate, and then again readily miscible with the saline solution from which it had separated. It is therefore evident that ammonium chloride separates the native combination of glycyrrhizim from its solution prepared with cold water, and also that a sufficiency of ammonia previously added prevents the precipitation probably by forming a more basic salt of glycyrrhizin which is soluble in a saturated solution of ammonium chloride.

From these observations the writer derived the following excellent and expeditious process long and successfully employed:

Take of licorice root in No. 24 powder, 32 troy ounces.
Ammonium chloride in No. 24 powder; sufficient.
Sugar, 6½ lbs. avoirdupois.
Ammonia water (16 or 18 per cent.), 3 fluid drachms.
Water sufficient.

In 6 pints of water dissolve 6 troy ounces of ammonium chloride and add the water of ammonia, moisten the root with 6 fluid ounces of this mixture, pack it firmly in a cylindrical percolator and pour on the remainder of the mixture, and then water until 4 pints of percolate has passed; in this dissolve 12 troy ounces of ammonium chloride, pour part of this solution upon the sugar, and when it has crumbled add the remainder, stir frequently with a pestle until the sugar has dissolved and strain through muslin. No heat is employed in this process, and the ammonia is completely saturated. The preparation is dark brown and permanently clear and transparent; it contains some albumin, and one fluid ounce contains one drachm of ammonium chloride and approximately represents 2 drachms of licorice root.

## SOAP LINIMENT.

BY R. ROTHER.

In the officinal process for soap liniment much difficulty is experienced by most operators when following the directions after the letter. The officinal manipulation is not only tedious and inconvenient, but also dangerous, by reason of the slowness with which the solution of the soap takes place, and the inflammability of the alcohol. Great care and much patience are therefore required, especially when preparing a moderately large quantity. Many also find that by using strong alcohol, as is usually the habit when simply alcohol is directed—during cold weather particularly—the liniment is far too easily congealed.

Hence in changing the formula it would be judicious to designate the alcohol as strong alcohol, and decrease the volume 1-8 accordingly. But above all, the process itself requires a renovation, the proportion of the ingredients remaining as before. By making the transposition in the formula as above indicated, the volume of water first prescribed will be exactly doubled. This gives two fluid ounces of water for every troy ounce of soap. Acting upon this circumstance the writer for a considerable time employed a very successful manipulation by pouring all the prescribed water upon the soap, which must best be in No. 12 powder easily obtained by simply sifting the dry soap shavings which so abundantly accumulate, and then applying heat until a uniformly smooth magma has resulted, embodying the soap as a jelly having all the appearance of the so-called soft soap. This when somewhat cooled was then mixed with alcohol, in which it rapidly dissolved.

But this manipulation also presented some inconveniences, although in the main vastly superior to the officinal process.

Noting the ready solubility of the gelatinized soap in even a small proportion of alcohol, the writer added a small quantity of alcohol in proportion of 1-6 to the water previously to adding the soap. This had the effect to dissolve the soap with marveleous rapidity, the application of heat for only a few moments sufficing to completely dissolve 24 troy ounces of dry soap, No. 12 powder, in a mixture of 3 pints of water and 8 fluid ounces of strong alcohol. From this result, and by increasing the officinal formula 6 times, the following process is derived:

| | |
|---|---|
| Take of soap (genuine castile, mottled or white), dry and in No. 12 powder - - | 24 troy ounces. |
| Camphor - - - - | 12 " " |
| Oil of Rosemary - - | 3 fluid ounces. |
| Water - - - - - | 3 pints. |
| Strong Alcohol - - | 10½ " |

Mix the water with half a pint of the alcohol in a capacious vessel; add the soap and apply heat until solution has occurred; to this add 4 pints of alcohol. In the remaining six pints of alcohol dissolve the camphor and oil; to this add the solution of soap; mix. Let the impurities (coloring matter of the soap) subside and filter.

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# TANNIN AND GLYCERIN.

BY R. ROTHER.

Tannic acid is frequently prescribed in concentrated solution with glycerin; but tannin, commercially obtained, possesses various impurities which either remain as insoluble turbidity or discolor the solution. Firstly, a green resinous coloring matter, insoluble in water but soluble in strong alcohol and glycerin, invariably occurs. This contamination results from the solvent action of the ether in the original process of extracting the tannin. Secondly, metallic chips of copper, iron, &c., from the vessels in which the tannin was dried are never absent.

A concentrated solution of tannin is nearly indispensable among the requisites of the prescription department. An aqueous solution, however concentrated it may be, will spoil. An alcoholic solution is often objectionable, but an aqueous solution, containing glycerin, can be utilized on most all occasions.

This solution is best adjusted by weight; it is perfectly stable, clear and transparent, and contains one troy ounce of tannic acid in two troy ounces of the solution, that is half tannin by weight. The solvent is the other half, or 1-4 each by weight glycerin and water. More than this proportion of glycerin cannot be used to advantage, as the liquid becomes too thick to pour conveniently. This solution can not be prepared, however, by directly combining the three ingredients, as the impurities must first be removed; and the only preliminary solvent for this purpose, which the writer has found to answer perfectly, is a mixture of equal measures of strong alcohol and water. A very concentrated solution, in the proportion of two parts of liquid to one of tannin, can be formed with the aid of heat, which filters with the greatest facility, leaving the resinous coloring matter and the metals untouched.

Alcohol alone, in the proportion of four to one of tannin, would not filter well. Water, in the proportion of at least four to one of tannin, would not filter even as rapidly as the solution with alcohol; and whilst the alcoholic solution becomes turbid with water, the aqueous solution never became clear from the first, and moreover was always much darkened by the metallic impurities forming colored soluble tannates. The preliminary solvent, and permanent solvent above proposed are therefore the only available ones. These form a light green, thin, syrupy solution, miscible with glycerin and water in all proportions without losing their brightness, and forming in a more dilute condition colorless solutions.

From these observations the following formula is deduced:

| | | |
|---|---|---|
| Take of | Tannin | 8 troy ounces. |
| | Glycerin | 4 " " |
| | Strong alcohol | 8 fluid ounces. |
| | Water | 8 " " |

Mix the alcohol and water; add the tannin and apply heat until the tannin has dissolved. Filter hot, then add the glycerin and evaporate by a careful heat until the solution weighs 16 troy ounces.

## BOTANY—THE REQUISITES FOR A PROFITABLE STUDY.

BY CHAS. FREDIGKE.

(*Continued.*)

Indispensable as an herbarium is to a profitable study of botany, it is open to many objections—chief among which are its bulk—a collection of any pretension requiring a room for the purpose, which must be kept dry and free from dust. Then, again, the fascicles must be frequently opened and examined for the ravages of insects, which in one short season may destroy the labor of years, though this may in great part be prevented by interposing strips of paper saturated with some strong smelling drug, such as opium, benzoin, assafœtida, camphor, etc. With all due regard to morphology in preparing plants for the herbarium, it is often next to impossible to preserve their natural appearance, they being pressed flat, obliterating the natural disposition of phytons, concealing organs of reproduction, and other essential characters, as in the convolvulaceæ, the gentianaeæ, asclepidæ, etc. Besides, they do not in many instances retain their natural colors, the shining appearance of leaves, the reddish, brownish, or yellowish hues of their greens being often impaired, if not entirely changed, and consequently lost. Many cannot be preserved at all, such are, for instance, the mushrooms and the fungi in general. Petrifying them by means of some saturated saline solution, or casting heated sand into them, results only in very partial success—shrinkage, discoloration, etc.—because their construction is very delicate, containing nitrogenous elements prone to decomposition. In the case of aquatic plants, in order to preserve them in anything at all like their natural form, the only way is to cut off in the water, and to catch them floating on a stiff sheet of packing paper, for in attempting to take them out without this precaution, they generally collapse, and cannot afterwards be so easily restored. For these and similar reasons, a collection of plates is a very desirable, if not indispensable auxiliary to an herbarium, for the representation of these natural objects on paper has many points in its favor; the large size of many plants precludes their preservation, and sections of their parts cannot convey an idea of their habitus, whereas a miniature representation will go far to supplement both; again the structure of many plants and their parts are so minute that they cannot be studied to advantage, when a magnified picture of their flowers, seeds, etc., will often be found very opportune. It is, of course, pre-supposed that delineation and tints are executed scrupulously true to nature, *i. e.*, there must be life in their lines, otherwise they are worse than useless.

But the peculiar and intricate construction of many plants, the often endless repetition of some minute part, precludes representation by hand, as of the filices, gramineae, cyperaceae, etc. In their case much was expected of photography, but it was soon found that by this means only pictures of shadows and almost no details were obtained, on account of the predominating green color of vegetables; truthfulness of out-line, and consequently of the general appearance being the result in its favor. The greatest improvement, however, which modern invention and research have brought to our aid in this respect, is the process called "nature printing;" it is not the property of any one in particular, but has been elaborated by different men in different countries during the last twenty years, though it may be said, that the imperial printing establishment in Vienna has, by its ample resources, done much to bring this process to its present state of perfection. Its main features are these: the plant treated as if intended for an herbarium is repeatedly moistened and dried and otherwise prepared to impart a certain resisting elasticity to its fibres, then laid upon a steel-plate, covered with a plate of soft lead, and the whole passed very rapidly between heavy rollers. An impression is thus obtained in the lead, which presents with the greatest fidelity every line, etc., of the natural object. From this impression electrotype-plates are prepared. On these the colors are laid, allowing a blending of tints in endless gradation; the paper, properly prepared, is then applied, and both passed between rollers covered with felting, producing that peculiar raised or embossed impression, so much conducing to a life-like appearance of the picture, and enabling the operator to turn out at once a perfectly colored copy. All the more minute organs are most faithfully reproduced, for instance in the filices, equisetaceae, etc., the growth of which is very favorable for this process, the sporangia, scales and every nerve and fibre are represented, indeed a very close examination is necessary to convince the eye of the imitation. That this beautiful invention has found thus far not a more extended application is mainly accounted for by reason of the heavy expense incurred in preparing the plates.

In order to profit by the study of botany it would be a great mistake to believe that a mere knowing of one or the other system and a superficial understanding of botanical terminology will constitute a knowledge of the science, for these are only means devised in contemplating the endless forms of nature. Nothing short of practically applying in fields and woods what has been learned will suffice. After a tolerable degree of facility and precision in determining plants has been gained and a certain reliance in ones own conclusions, a desire is felt to know something more than names and external features; then a study of the internal structure of vegetable organisms, their physiology, etc., will be found of absorbing interest, whereas, if too early commenced would per chance be found only dry and unimportant, because but partially understood and therefore slighted. Then, too, we will be prepared to institute comparisons of entire orders of plants with each other, to consider them as to their geographical distribution, the influences of climate, transplantation, etc., etc., and finally their relation to science and art,—that is agriculture, technology and—pharmacy our profession. Then only will a knowledge of this branch of natural history be duly appreciated.

On more extended excursions it will be found convenient to have a strong cane for support, one end of which forms a hook as a handle to reach down branches and fish up objects from waters, the other extremity ending in a steel-point which may be inserted into a small spade, for the purpose of digging out roots, etc.; a stout pocket-knife for cutting woody branches, a pair of fine pincers, a magnifying glass of four or five powers, a needle and a pen-knife for dissecting flowers, etc.; paper and pencil for taking notes, and the already mentioned portfolio with a supply of unsized paper, (a good size is 16x20 inches,) having two buckles and straps along its long side and one of each on the opposite ends; this is much better than a so-called botanical box, for it is preferable to study a few plants on the spot where they grow and lay them in, than to gather a quantity, jumble them into the box in the hope to study them at home when we are tired and indifferent, our plants wilted or at least altered in appearance. It is not the quantity we preserve, but the number, however small, which we learn to know and understand thoroughly. A compendious local flora completes the outfit. Thus equiped we are ready for the work, a little perseverence *et exercitium facit magistrum.*

CHICAGO, September, 1871.

P. S.—On page 225 of this journal read *Botane* instead of "Boravy."

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## EXCERPTA.

*Artificial Milk.*—M. Dubrunfaut denies that the butter in milk is enclosed in a membrane surrounding the globules, since he can produce, by emulsionizing a fluid neutral fat in a slightly alkaline fluid, like the whey of fresh milk, a liquid closely resembling milk, and showing, under the microscope, butter globules. He proposes to make an artificial milk by dissolving in half a litre of water 40 or 50 grms. of saccharine material (milk-sugar, cane-sugar or glucose), 20 to 30 grms. of dry albumen (prepared from dry white of egg), and 1 to 2 grms. soda crystals, then to emulsionize therein 50 to 60 grms. olive oil or other edible fat. *Comptes Rendus.—Amer. Chemist.*

*Explosive Force of Gasseous Mixtures.*—According to Berthelot, the explosive force of detonating gaseous mixtures surpasses that of all solid or liquid compounds. With oxygen and hydrogen it is five times that of ordinary powder, and two and a half times as great as that of nitro-glycerin.—*Ibid.*

*Protection of Iron and Steel from Rust.*—Prof. Crace Calvert has found that the alkaline carbonates preserve iron and steel from oxidation as well as caustic soda or potassa. A plate of iron immersed in a solution of sodic or potassic carbonate was preserved from oxidation for two years. A similar result has been obtained with sea-water, to which soda or potassa had been added, and these facts seem to be susceptible of numerous and important applications.—*Ibid.*

*Production of Chlorine.*—Deacon's process for the production of chlorine on a large scale, consists in passing a mixture of air and hydrochloric acid, at a high temperature, over a mass of bricks saturated with sulphate of copper. The oxygen of the air removes the hydrogen of the acid and sets free the chlorine, forming a continuous supply. The sulphate of copper acts merely by catalysis, so that when the apparatus is once arranged, no farther supply is needed and the decomposition proceeds without interruption.—*Ibid.*

*Alkaloids Detected by Picric Acid.*—Mr. Hager has found that this acid precipitates various alkaloids from their solutions, such as brucine, strychnine, veratrine, quinine, cinchonine, and some alkaloids of opium. Morphine and atropine, however, are precipitated only from neutral and concentrated solutions, and the precipitate dissolves pretty easily in water. Glucosides, casein and pseudo-morphine resist the action of picric acid.—*Ibid.*

*Separation and Quantitative Determination of Nickel and Copper.*—If to a solution of the mixed sulphates of nickel and copper, a few drops of sulphuric acid be added, the whole of the copper can be removed by depositing it upon platinum, by the aid of the galvanic battery, and if the remaining solution be then made alkaline with ammonia, the whole of the nickel may be plated out in the same way.—J. M. MERRICK, S.B., in *Am. Chemist.*

*Hydrochloric Acid an Antiseptic.*—In a paper on the Theory of Disinfectants, Mr. T. P. Blunt reports the following experiment. A piece of meat immersed for fifteen minutes in a mixture of one part of hydrochloric acid to three of water, remained entirely free from putrefactive change after nearly a fortnight, though the action of the acid was not sufficiently powerful to prevent the appearance of mould. The meat was then immersed in a dilute solution of carbonate of soda, and the superficially absorbed acid was thus converted into common salt. This reaction obviously gives hydrochloric acid a great advantage over other antiseptics, which introduce into the food a foreign substance, inimical by its very nature, in most cases, to the process of digestion.

*Chloral Hydrate, its Solvents, &c.*—According to R. F. Fairthorne, chloral hydrate is readily dissolved by alcohol, ether, turpentine, benzole, bisulphide of carbon and the fixed oils. When equal parts of chloral hydrate, in crystals, and camphor are shaken together in a vial and allowed to stand, a clear solution results, available, perhaps, as an external application. The alkaloids are generally soluble to a considerable extent in a strong aqueous solution of chloral.–*Am. Jour. Ph.*

*Chloral Hydrate and Sulphide of Ammonium.*—C. J. Rademaker, M. D., commenting upon the color reactions between chloral and sulphide of ammonium, shows the unreliability of this test for the purity of chloral hydrate. He observed that the action was the same with the pure article and with that in which decomposition had commenced. He states further that if chloral becomes slightly acid, decomposition progresses very rapidly.—*Ibid.*

*Soap Liniment.*—J. C. Wharton suggests the following method of preparing this liniment with the officinal materials but modified manipulation, the object being to obviate the use of heat, and expedite the process. The result will be preferable to the officinal, in that it will be less liable to gelatinize in cold weather:

| | |
|---|---|
| Take of soap, in small pieces . | 4 troy ounces. |
| Camphor . . . . . . . | 2 troy ounces. |
| Oil of rosemary . . . . | ½ fluid drachm. |
| Water . . . . . . . | 4 fluid ounces. |
| Alcohol . . . . . . | 2 pints. |

Beat the soap in a dry mortar until the lumps have disappeared; then add by degrees the water and triturate; when well mixed add the alcohol gradually, afterwards the camphor and oil of rosemary, rubbing with the pestle till all are dissolved, and filter.—*Ibid.*

*Syrup of Senna.*—Mr. J. B. Moore observes that this really useful preparation, though no longer officinal, is still in demand; the old process was objectionable as the product was variable, and liable to fermentation. He proposes as a substitute, affording a syrup of the same strength as that formerly used, the following process:

| | | |
|---|---|---|
| R | Pulv. Sennæ, No. 60, . . | two troy ounces. |
| | " Fœniculi, No. 60, . . | one troy ounce. |
| | Sacchar. Alb., sifted, . . | nine troy ounces. |
| | Glycerinæ, . . . . . | four fluid ounces. |
| | Alcohol, dil., . . . . . | sufficient quantity. |

Mix the powders, and, having moistened the mixture with dil. alcohol, pack it firmly in a glass funnel prepared for percolation, and gradually pour diluted alcohol upon it until the mixture is exhausted. Set aside in a shallow dish, in a warm place, the first four fluid ounces that pass, to evaporate spontaneously to two fluid ounces. To the remainder of the percolate add the sugar, and evaporate in a water bath, at a temperature not exceeding 160° F., with frequent stirring, until the whole measures, when cold, ten fluid ounces. To this add the glycerin and the reserved portion, mix well, and strain through muslin. This yields a permanent and reliable syrup.—*Ibid.*

*Active Principle of Polygonum Hydropiper.*—C. J. Rademaker, M. D., has made a chemical examination of this drug, isolating a crystallizable acid, of a green color, acrid, and bitter taste, strong acid properties. This is regarded as the main active ingredient of the drug, and is designated polygonic acid.—*Ibid.*

*Cundurango.*—This plant belongs to the family *Asclepiadeæ*, the flower, the leaf, and the pod, and also the seed and silk fibres resemble greatly our own milk weed. Some six varieties of this plant are said to exist, but three of which have been much used medicinally. That variety called in Spanish "dog killer," is the only "true cundurango," "easily distinguishable from all other varieties by the fact that when cut transversely, the bark of the vine is full of small red crystals, which are resinous and shining in cells." Much of a spurious article is said to be afloat.—*Ibid.*

*Colored Lights.*—Braunschweizer recommends the following mixtures as not producing injurious fumes: For red lights, 9 parts nitrate of strontia, 3 parts shellac, 1½ parts chlorate of potassa; for green, 9 parts nitrate of baryta, 3 parts shellac, 1½ parts chlorate of potassa; for blue, 8 parts ammoniacal sulphate of copper, 6 parts chlorate of potassa, 1 part shellac. In all cases the ingredients should be reduced *separately* to a coarse powder, and be mixed without much friction.

*Color of Flourescent Solutions.*—As a result of a series of experiments, H. Morton, Ph. D., has arrived at the curious conclusion that all the familiar flourescent solutions, such as the tinctures of turmeric, of agaric, of chlorophyl, and the nitrate of uranium, emit light of the same color by flourescence, namely, blue, identical with that developed by acid salts of quinine. This blue, as is well known in the case of quinine, is not of a single tint or refrangibility, but yields a continuous spectrum, in which the more refrangible rays predominate.

*Chloral Hydrate and Cod Liver Oil.*—The addition of chloral hydrate to cod liver oil has been highly recommended for phthisical patients, as it prevents the night sweats, induces sleep, and creates an appetite, at the same time rendering the oil more palatable. The solution is made by digesting on a sand bath, with a gentle heat, ten grms. of pure chloral hydrate with 190 grms. cod liver oil.

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## DETERMINATION OF CITRIC ACID.

BY H. KAMMERER.

Soluble citrates mixed with acetate of baryta, either hot or cold, produce a white amorphous precipitate, being $3\,BaO,\ 2\,C_{12}H_5O_{11},\ 3\,HO+14$ aq.

If, after precipitation, an excess of acetate of baryta be added, and the mixture heated in a water bath, the precipitate becomes heavy and granular, it loses one-half of its water of crystallization, and has now the composition $3\,BaO,\ 2\,C_{12}H_5O_{11},\ 3\,HO+7$ aq.

The presence of other organic acids does not interfere; the granular salt is absolutely insoluble in water, and citric acid may thus be easily determined. If the solutions are very dilute they must be concentrated by evaporation, after addition of acetate of baryta, or the precipitate will consist of crystalline needles containing only 5 aq.—*Pharm. Jour.*, *London*, from *Zeitschr. fur Analyt. Chemie*, viii. p. 299.

# THE COMPOUND IRON MIXTURE OF THE PHARMACOPŒIA.

BY C. A. STAPLES.

This has always been a favorite medicine, and, when carefully prepared, is perhaps one of the safest and most efficacious of the tonic chalybeate emmenagogues, and, consequently, it is the one most frequently prescribed, but it has always been exposed to the great objection that its extemporaneous preparation takes considerable time, and it cannot be kept ready for use, as its character soon changes,—a few hours making a perceptible difference in its appearance, even if it does not in its medicinal efficacy. To remedy this defect, I endeavored to prepare it in a concentrated form in two bottles. After a few experiments, I adopted the following formula, which I have used for a number of years, and the result has been so satisfactory as to leave nothing to be desired:

| | | |
|---|---|---|
| *R* | Gum. myrrh. | two ounces. |
| | Potas. carb | one ounce. |
| | Sp. myrist. | eight ounces. |
| | Aq. rosæ ad | twenty ounces. |

The myrrh should be carefully selected—clean pale pieces, presenting an opaque fracture being the best. Beat it as fine as possible in a large mortar, then add the carbonate of potash with a little rose water and grind it to a smooth paste, gradually add about half a pint of rose water to make a fine emulsion, add the spirit of nutmeg and as much more rose water as will make it twenty ounces; preserve it in a stoppered bottle, labelled "Concentrated Myrrh Emulsion pro Mist. Ferri Co., one drachm to one ounce."

For the other bottle, boil 2 fluid ounces of distilled water in a glass flask; add —j of sulphate of iron, pure and free from oxide, dissolve and filter it in a 6 ounce bottle and fill it up with simple syrup; label it "Syrup of sulphate of iron gr. j in *m* vj, or *m* xv to each ounce of Mist. Ferri Co."

These preparations will be found very convenient; as for each ounce of the mixture you have merely to measure 1 dr. of the emulsion and *m*xv of the syrup, dilute each with a portion of rose water, mix and fill the bottle with rose water, and mist. ferri co. of excellent quality is made in a few seconds.

Both preparations keep well; the quantity of spirit in the emulsion preserves it from decomposition, and it rather improves by keeping; and the syrup will be found to keep free from oxide, which the crystals rarely are, however pure they may appear to be. It may also be used for dispensing sulphate of iron in other mixtures, where the sugar is not an objection; for this purpose I make the above solution of —j of sulphate into an 8 ounce bottle of syrup; this gives one part of sulphate in eight measures of syrup, which I find more convenient for general dispensing, but it contains too much sugar for the mist. ferri co. as directed in the present edition of the Pharmacopœia.—*Pharm. Jour., London.*

# ON FERMENTATION.

BY PROFESSOR A. W. WILLIAMSON, F.R.S.

*Before the Society of Arts. Reprinted from the Pharmaceutical Journal, London.*

## LECTURE IV.—CONCLUSION.

In the process of making wine, there are a considerable number of operations which are occasionally considered rather extraneous to wine making, and are by many persons classed amongst frauds. Materials are sometimes used in aid of the natural constituents of the grape juice, materials which contribute to the quality of the product: some of them by adding materials to it, but others simply removing from the substances bodies which are not wanted in it. And I must say that it does appear to me a great error to object to the introduction of any new conditions which may be found to effect an improvement in the product. I do not think it is reasonable to suppose, because wine is only known by the vulgar as fermented grape juice, that for that reason nothing but grape juice ought ever to be used in the manufacture. I think it would be desirable—in fact, it ought to be almost compulsory—that persons should state what materials are present in substances which they sell to the public; but, I think, with that safeguard, it would be right to leave manufacturers perfectly free to employ whatever materials they might find most conducive to the elaboration of their products. In some countries, grape juice is exceedingly rich in acid and poor in sugar (and I think a good deal of wine is rather of that class), and wine makers in such districts find that their stuff is more drinkable if some of the acid present in it can be removed before it is sent out. They therefore put into the must, in fermenting the wine, some chalk, and the lime which is present in the chalk combines with the tartaric acid and takes it out of the liquid. Thus, the sour liquid is rendered less sour, and certainly that is not, in any degree, or to any extent whatever, a fraudulent admixture. Nothing is added, but only an unpleasant substance is taken from it. It also happens in precisely the same districts, that from the paucity of sugar which is present in the grape juice, the wine is too weak in alcohol; and that to meet the requirements of consumers, many wine makers now add sugar in the process. Now sugar is one of the natural and proper constituents of grape juice, and if the grapes contain too little of it, it does seem quite proper and desirable that more should be added. However, in the subsequent making of wine, there are several other processes which are less natural than these, and about which some greater difference of opinion may possibly prevail; and one of the commonest, not only amongst wine makers, but also amongst wine consumers, is the process of fining. In order to establish the effect and the meaning of this process, I think we must trace back the history of wine from the time in which it is first put into casks by those who produce it to the time at which it gets into the hands of consumers. It is customary—I cannot say whether it is universal or not, but I believe it to be so almost—to put new wine into new casks; and in the better districts oak casks are used. New wood is far more porous than old wood when used for such a purpose; and of course the wine, when put into the cask, sinks into the wood, so that the outer surface is moistened, and allows some of the water and alcohol, and the various volatile materials to evaporate. In fact, the wine diminishes during the first year of keeping in wood very rapidly, by a process of evaporation. But this is not all. Whilst the water and alcohol are evaporating from the outer surface, air is dissolved by the liquid which is in the wood. Air actually diffuses itself through the wet wood into the body of the wine in the cask; and what is more than this, the water and alcohol which go out are replaced by something. The cask does not collapse, nor is there a vacuum produced above the liquid. The wood is always sufficiently leaky for air to come into it, and there is always a space left above the wine. Wine makers are, therefore, in the habit of filling up their wine casks periodically. In some districts in France, they are filled up in the first year three times, at three different periods; and, in the second year, they are filled up only twice, but only at perfectly definite periods or seasons, which have been found, for those particular wines, to be most advantageous. But each time the wine, if examined carefully, is found to have undergone, not only what we chemists should call a process of concentration, the solid substances dissolved in the liquid of course always remaining behind, the proportion of liquid being diminished, but, at the same time, it has undergone other changes, that is, there is a deposit formed from it. Some of the bodies present in it, either by themselves or by forming compounds with others added to them, form a sediment, and in the wine growing districts it is customary, and I have no doubt necessary, to decant the wine and pour it off carefully from the deposit many times, for the presence of the deposit, if continued in the wine, would be injurious to the future changes which it has to undergo. When this comes into the hands of the consumer, there is suspended in the substance of the wine some of this deposit,—some solid particles which might be got to settle down, but which could not easily be removed completely by any process of mere subsidence, and the processes of fining, which are exceedingly various, have for their object the more complete removal of these solid particles by forming compounds with them. In some cases, the process consists in forming what I might call a sort of mordant, or something like a process of dyeing, in which a gelatinous compound is formed in the body of the liquid, which carries down with it a good deal of coloring matter, which it encloses, and which does, while going down, take with it a number of little filaments and cells, which were floating in the liquid, and which were so exceedingly light that they would not have settled, and could not have been removed otherwise. This point is particularly important in relation to a process which I shall presently mention. In some cases, it has been thought the wine contained too much albuminous matter. The theory of fermentation which was held for a long time, and which we considered at one of our previous meetings, consisted in attributing the process to the decomposition of the albuminous matter which is present in the fermenting liquid. It was supposed that there was too much of this albuminous matter present, and that it remained and was inclined to do further work. One process which has been adopted to a considerable extent in the champagne districts, where that was supposed to occur, consisted in adding tannin, a substance which I have already spoken of, which carries down a good many albuminous bodies, forming a precipitate with them,and with these no doubt carries down the solids which may be in suspension. Then another process, which really bears a considerable resemblance to this one in principle, although not in form, is that of sulphuring, using sulphur in the casks, which, of course, you would understand at once, exerts an antiseptic action. It is, in fact, a process which consists in producing a material which is, in plain English, a poison to any germs which may happen to be present, whose action must consist, as far as it goes, in arresting the vitality,—in stopping any work which they were doing. M. Berthelot, who has made many accurate experiments regarding the composition of wine and the changes which it undergoes, subjected some wine to the action of a known quantity of air, and by examining the wine afterwards he was led to the conclusion that air is an unmixed evil to wine when once it is fully made. There are certainly many general observations which everybody must have had occasion to make which agree with that. If we open a bottle of wine and use half of it, especially if we leave a bottle of light wine open for some little time, everybody knows that it deteriorates in quality, and becomes flat, or even sour. In a great many cases, it is found that there is a development on the surface of the wine, and if you were to examine it carefully you would easily see, especially in light French or German wines, a pellicle—in fact, the vinegar cells; and their presence must have the effect of promoting the oxidation of the wine. M. Berthelot's experiments confirm the general observation, which everybody makes more or less definitely, that air is noxious to wine when present in any quantity. But M. Pasteur has arrived at precisely the opposite result. I do not mean to say that he says air cannot do harm, but that what is hurtful in air is the excess of it, or the too rapid rate of its action. He lays down the principle that every ripening of wine, or the process by which young and crude wine is changed into good old wine, consists in a process of slow oxidation; that is its very essence, and that without that a crude young wine cannot be mellowed or transformed into a good old wine. The evidence which he gives for his conclusion is exceedingly simple, and I must say it appears to me exceedingly conclusive. He has, for the purpose of keeping wine with air, and for the purpose of keeping it without air, resorted to appliances which are far more effectual than those generally resorted to in common life. You may be aware that a cork, even what we should consider a good cork, does not completely prevent the communication of external air with liquids in a bottle. I do not suppose many people can know how much air passes in and through a cork, but the quantity is very great. M. Pasteur sealed up some young green wine, by putting it into a glass vessel, and then he melted up the neck, so that he had no air present with it. He then kept it for a considerable time, and he found that his wine, even after years' keeping, was as green and as young as at first; that wine kept under conditions such as that air could have no access to it did not undergo, to any extent, the change which was wanting, and that it did not improve by keeping. He then sealed up, in a similar vessel, some wine with air, and he subjected the wine, with a known quantity of air, to various influences which were calculated to accelerate the action of the air upon it, and amongst these I ought specially to mention that of light. He took some small vessels made of perfectly clear glass, and sealed up his wine, various qualities of it, in these little vessels with air, and then exposed them to the sunshine in the south of France. He found that the oxygen of the air was totally dissolved, and that, when he examined the air, the oxygen had gone, but he found that his wine then did pass over rapidly into a state exceedingly like that into which it passes by the ordinary process of keeping in bottles. It lost its harshness, and became like old wine, which it resembled very greatly in its quality, and also in its composition the older kind of wines. At the same time, he found that there was formed in such quality of wine a considerable amount of deposit, and his explanation of the way in which oxygen acts so as to improve the quality of the wine, is this, that it serves gradually to take away from the wine various substances which are present in it, and that the deposit is due to an oxidation of the coloring matters present, which have an unpleasant, astringent, harsh taste, and it also consists in acting upon the alcohol of the wine and upon the various organic liquids in it in a similar manner. This result is certainly one of very great importance; for if the process of improving wine requires the action of oxygen, and if, on the other hand, the action of oxygen may do much harm,—I mean if all the good has to come from the oxygen, and if all the worst evils come from oxygen,—and that really is the position in which the question stands upon our present evidence, it must be of the greatest importance to ascertain what are the conditions under which the beneficial action can be exercised, and what are those under which its detrimental influence occurs. In that respect, both of the observers I have mentioned, and others also, have established some remarkable facts, but in order to appreciate them duly, it will be necessary for you to know something of the general character of compounds to which I must now make allusion. When we were examining the process of oxidation, I spoke to you of alcohol as a substance eminently capable of undergoing oxidation, and showed you how readily it could be burnt to a much smaller extent than that to which we are in the habit of burning it. I had to mention ordinary acetic acid as being a product of a shorter combustion. Here is a vinegar plant which is oxidizing under alcohol, and there is an intermediate body which I have not yet spoken to you about specially. Here in this I have some of it dissolved in alcohol. It is a substance which, in the strong state in which I have it here, has rather a sickly odor, and it was named by Liebig, to whom we owe some of the first and most accurate facts in relation to it, aldehyde, a name serving to recall one of the most important facts about it, viz., that it is alcohol from which hydrogen has been taken away. If you were to take away from alcohol some of its hydrogen, you would have aldehyde,—it is alcohol minus one-third of hydrogen, and it is, therefore, alcohol de-hydrogenized, and that is the origin of the term. When wines are undergoing very slow oxidation, it appears that aldehyde and other bodies analogous to it are formed. A great deal of evidence has been adduced of this, but I ought to mention that as yet one link in the chain of evidence is wanting, which chemists are always anxious to get in proof of their conclusions, that is, the substance itself, in a pure state, has not been obtained from wine. Still, the proof is so far conclusive that we are prepared to admit it provisionally. One fact which I mentioned to you just now is very remarkable, as part of the evidence, viz: that wines which are particularly good, either by keeping or by their own composition, combine with oxygen which is dissolved in them. Now, aldehyde is particularly greedy of oxygen. If you were to dissolve in the aldehyde in this bottle some air, and if you were to try to get the air out of the alcohol again, you would find that you could get the nitrogen of the air out again completely if you went properly to work, but you could not get the oxygen out. The oxygen is laid hold of and digested so rapidly by the aldehyde that it is no longer to be recovered, after even a very short interval of time.

I might show you one case of the avidity with which this aldehyde absorbs oxygen. On putting into a glass a solution of nitrate of silver, and then adding a little ammonia, we should find, on pouring into it a little of this aldehyde dissolved in alcohol, there would be a deposit of metallic silver around the inside of the glass. This is a very common and easy way of ascertaining whether in a mixture any body of this class is present. The ammonia liberates the oxide of silver from the nitrate, and the aldehyde acts by taking away the oxygen and precipitating the silver, and in this way we get evidence of the greediness with which aldehyde takes up oxygen. There are several other interesting reactions of this aldehyde, and amongst them I ought specially to mention one which was discovered some few years ago by some very distinguished Italian chemists, the action of which is most exact and clear for removing aldehydes from any substance in which they are present; that is, their combination with alkaline bisulphites. This common aldehyde, and every body of the same class, combines with bisulphite, and forms very definite crystalline compounds, by which they are very easily detected and removed.

When we oxidize alcohol very slowly and gradually, we are able to get aldehyde formed from it; and, in the ordinary process of keeping wine, when it undergoes that slow oxidation which Pasteur affirms to be the proper process, aldehydes are proved to be present in it; but, together with them, there are a considerable number of other bodies, which we are in the habit of calling ethers. I have spoken to you already about some ethers; for instance, the compound which sulphuric acid forms with alcohol, that is a kind of ether, although it is not one of the bodies we are commonly in the habit of so describing. Ethers represent a class of bodies which are certainly amongst the most pleasant of chemistry. I have a good many here; one is the commonest of all; it is the ether which is, I believe, present, to judge by the flavor at any rate, in the celebrated *Lachryma Christi.* It is a body which I might describe as a salt. It is a salt formed whenever hydric acetate, the hydrogen salt of acetic acid, is present for a sufficiently long time in alcohol. Whilst the alcohol of the wine is becoming oxidized, and whilst aldehydes are being formed from it, there is also formed some acetic acid, and also probably some valerianic acid, butyric acid and others analogous, which are formed by the oxidation of the bodies present with the alcohol. All these acids, while undergoing the process by which they are formed, combine with the alcohol and bodies like it, and form these ethers; and it has been already shown that, at all events, in some cases the aroma of the wine is dependent upon the presence of bodies of this kind. One of the most remarkable processes of manufacture of bodies of the kind which has been successfully performed of late, is the process of preparing artificial ethers, for the purpose of imparting to alcoholic liquids the same flavor, aroma, or bouquet which they are found to possess when made from the same natural substance; for instance, oil of brandy is got from the skins and seeds of the grape which are left when the grape juice has been pressed out. They are fermented, and a quantity of alcohol and aromatic substances are formed by the fermentation, and this forms the so-called oil of brandy, which is used for making brandy artificially; that is, common corn spirit is flavored with it, and sold as genuine cognac. In like manner, various kinds of these acids have been made, and there is now in Germany a manufactory for making butyric acid on a large scale from sugar; it is then made into this ether, which is a very fragrant substance, and then in small quantities it is used for flavoring various alcoholic liquids, in imitation of natural products which naturally would possess the same substance or a similar one in them.

Amongst the processes which are detrimental to the quality of wine, I have already mentioned the excess of air having access to it. That is the one which is most known, and against which people least need to be cautioned, but it has been found by wine growers and wine makers, especially in the case of higher class wines, like those of Burgundy and some other districts, are liable to particular maladies which produce evils, each one quite peculiar and different from the others. Amongst these maladies, the first and simplest of all, is acetification, or the transformation of the alcohol into acetic acid. That is one which is so well known now, and so well understood, that, I think, wine growers are well able to guard against it with tolerable completeness. By the use of a microscope, these little acetic cells on the surface of the liquid would at once be seen, and you would know, of course, that there would then be a tendency in the wine to pass over into acetic acid, and that, unless those cells are removed, or if they are present, unless oxygen be excluded,—because the presence of the cells does not of itself make the wine into vinegar, it is necessary that they should be present with a centinuous supply of air,—so that if they are removed, or if you prevent a supply of air, that malady is arrested or cured. But there is another malady which is well known, and frequently spoken of amongst wine growers as the "turning" of wine. It is a process which is, in its general features, something analogous to acetification, but chemically it is very different. When the wine is put into casks, it begins to give off gas, and in French they call it *la pousse;*

it pushes out the ends of the casks, and, if a hole were made, the wine would be ejected with considerable force. M. Pasteur has examined not only the wine itself when undergoing this process, but also the deposit, the little solid particles which are present in it, and he has found two things which are correlative to one another,—in the first place, that there is always present in wine which is suffering from this malady certain little films, which can be seen quite distinctly by the microscope, and which are different from any particles found under any other conditions, and which he therefore believes to be little organic bodies, just as much as in the alcoholic ferment or acetic ferment, and he calls them the ferment of the turning or *la pousse.* That is one fact which is established. These little particles are compared in their structure to little bamboos, as they consist of little straight joints, one at the end of the other, the length being considerably greater than the diameter; they are not little spherical matters, like the wine ferment, and their diameter is exceedingly small, being about the one-thousandth part of a millimetre. That is one fact which M. Pasteur has established, and the other is this, that while this process is going on, lactic acid is present; and his explanation of the malady consists in attributing it to the presence of this particular parasite in the wine, which is transforming the materials of it into lactic acid, with no doubt some other product, at the same time. Another malady which not unfrequently occurs in wine, is ropiness; and it is said that wine suffering acutely from this malady might almost be mistaken for oil, when poured from one vessel to another, so thickly does it flow. That peculiarity is attributed solely to the presence in it of a number of little films peculiar to it; but they are very different to the eye, and very different also in their functions from the films which constitute the active agency of the process I have just mentioned, that of turning. These little films are like little strings of beads, little spherical particles, a great number of them joined end to end. The particular nature of the transformation which the wine undergoes has not been investigated, but, as far as M. Pasteur's observations go, and they are very numerous and accurate, these little strings of beads are really active agents in that particular transformation which constitutes ropiness, and which destroys wine; for, if it cannot be arrested, the wine ceases to be drinkable, and becomes worthless. The fourth malady, which is also one of frequent occurrence, is one which produces a bitterness, and it is said that this malady is one to which wine is subject in its youth and also in its old age; that it sometimes occurs when wine is two or three years old, and sometimes, though in a less acute form, when it is very old. Here, also, a particular parasite is present, little organized particles, which have been minutely described and depicted, and they are found in various states, some differing very much from the others. Some pictures of the parasites which constitute the bitter ferment are like little branches with a number of little knobs or warts upon them, and some of them are clear and transparent, whilst others are coated with an incrustation. M. Pasteur, however, has already shown that the little knobs or warts upon them, and the incrustation which frequently occurs, are nothing else than foreign matter deposited upon them, that when the parasite dies it is liable to be encrusted, but that in a pure state it is clear and transparent. This parasite, when it occurs in young wine, renders it completely worthless, but when it occurs in old wine, it only gives such an amount of bitterness as is not fatal to the wine, and is, to a certain extent, exceedingly common, so that it is considered almost a natural accompaniment of old wine. Amongst the remedies for these processes is sulphurous acid, which, of course, would destroy parasites when they are present. We can quite understand that wine which has got germs of these little organic beings present in it is liable to undergo these injurious changes if the germs are allowed to develop themselves, but that it would be free from all such tendency if, by any poisonous material, the little germs or organisms were destroyed. We can also understand that any mechanical process of filtration, or of forming in the liquid a gelatinous mass which will subside and carry down with it any fine particles which may be present in suspension, but which are too light to settle of themselves, would effect the same object; and it is quite intelligible, that if Pasteur's view is correct, that these little solid particles are the active agents of those transformations, the processes which have commonly been in use for preventing the detriment of wine by such changes should be effectual; we can quite see why they ought and indeed must be effectual, but, at the same time, we cannot help seeing that they would be very liable to be incomplete. Of course, it is a matter of chance whether, if you form a precipitate in the liquid, the little light particles would all happen to be caught by some of this precipitate when going down. We should expect that any such process would be efficacious in diminishing the evil, but not in arresting it completely, and I believe that is exactly what is found by experience.

M. Pasteur has introduced a process which, I gather from his statements, has already been adopted by a considerable number of wine growers and merchants, which goes to the root of the matter in such a way as to leave nothing to chance, for he has proceeded upon the knowledge previously acquired by his accurate and masterly experiments, regarding the nature of all these little organisms, and the conditions which are favorable to their development, and which are destructive of them. He finds that when wine is heated to near the boiling point, in any vessel in which it may be enclosed, and left in that vessel to cool, it may then be kept (provided the vessel be not opened) for any length of time without undergoing any of these deleterious changes. He finds also that so high a temperature as that I have named is not absolutely necessary, but that even if wine, which on keeping would be subject to the malady of acetification or ropiness, be heated to a temperature of 60° Centigrade (that is, about 140° in the clumsy and inconvenient scale which is still, I am sorry to say, in common use in this country), it will kill these organisms completely; and the experiment is so easily performed that any of you may do it with a very moderate amount of care. You ought to perform the experiment with several bottles at the same time, and to keep some similar bottles in the original state, in order to observe the difference. In the month of September, when I last saw M. Pasteur, he gave me several bottles of wine, some of which were in their original state, whilst the others had, after bottling, been heated to a temperature of 60° or a little more. I have not yet opened any of them, but I have some of each sort here, and we will presently see what has been the result of the treatment. I ought to say that they have not been kept with proper precautions, for, on opening the case, I found that it had been left in such a position that the bottles had been standing with their necks upwards, which is not very favorable to the preservation of the wine. The experiment is so simple, that it is worth while for everybody to perform it. You should take some light wine, which you have reason to believe will not keep well; the bottles should not be too tightly corked, and there should be a little space left below the cork. You put several of these bottles into a vessel of water, cautiously if the water be warm, to avoid breaking them, and with them one bottle full of water, uncorked, you then warm the whole very gradually, until you find, by inserting a thermometer into the open bottle of water, that the temperature is up to 140° Fahrenheit; you then allow the whole to cool slowly. The corks are generally lifted a little by the expansion of the liquid and air within the bottles, and will require to be struck in again to their proper place. The same operation is performed on a large scale by wine growers and merchants in France, in casks, and several contrivances have been described for the purpose. The simplest of all is to put a cask, with its bung upwards, into any convenient vessel of water, so placing it that the top of the cask is just above the water. The water surrounding the cask is then warmed gradually until it is found, by lifting the bung and inserting a thermometer, that the wine is of a temperature of 60° or 70° Centigrade. The bung is then closed and the whole allowed to cool. Another form of apparatus has been figured in a late book of M. Pasteur's on acetification, which consists of a cask with one of its ends removed, and replaced by a sort of double bottom of metal. This cask is then put on the fire, so that the water in the false bottom may be heated, and raise the temperature of the wine in the cask above, without danger of burning it. M. Pasteur recommends that when the wine has reached the right temperature it should be allowed to run, while still hot, into the cask in which it is to be kept, so that any little germs which may be present there may be as much heated as the wine which comes in contact with them. He heats the wine in this operation to about 65° or 70°, but he says there is reason to believe that even 50° is sufficient. Upon all occasions on which it has been tested it has been found that the little parasites which are present, and which are the seeds of the maladies of which we have been speaking—and, no doubt, other organisms—are changed in such a manner as to be practically dead. Whether they are susceptible of being revived is another thing. It is not known, and it is not affirmed that there are no germs which might not, by contact with oxygen, be afterwards brought into life; but practically there are no organisms in the wine, after that temperature has been applied to it, capable of growing in the closed vessel in which it is kept. M. Pasteur says that if the wine were, after that treatment, bottled, he would expect that some bottles would contain wine which would spoil, whereas the greater number probably would not, the reason being that the wine, on its passage from the cask to the bottle, would be liable to get some little germs from the air which possibly might retain some vitality, which would be stimulated by the oxygen. Therefore, all he affirms is, that when the wine is kept in the same vessel in which it was heated, it undergoes no further change whatever.

With regard to the ordinary process of ærating wine by keeping it in bottles, I should like to show you an experiment which illustrates, in a very simple way, what is a very familiar well known fact. Every one who has had occasion to keep wine knows what an immense difference there is if you keep a bottle standing upwards or lying down. The difference is of this kind. If it stands upwards, the cork is dry, and air has access at a very rapid rate to the contents of the bottle, and the wine gets oxidized and spoilt; whereas, when the bottle is left lying down, the cork is wet, and the air has access much less rapidly,—in fact, only at such a low rate as is suitable for mellowing and improving the wine. I have here a couple of glass tubes, both open at one end, and closed at the upper end by a porous substance, which I may call a cork—it is, in fact, a cork made of plaster of Paris, a particularly porous substance—one cork being wetted, so that the pores are full of water, whilst the other has been carefully kept dry, and this one is covered for the present with a little cap to prevent the access of the air. Here, in another vessel, is a mixture which is giving off hydrogen gas, which is passing upwards into these two tubes, one with a wet cork and one with a dry one. After a minute or two, both tubes will be full of pretty nearly pure hydrogen, and then we will remove them, and put the lower ends into this jar containing a colored liquid. Most of you know that this porous substance allows hydrogen to pass through it more rapidly even than the air which is now outside passes in, and therefore as the hydrogen passes out of these tubes more rapidly than the air comes in, the liquid will be sucked up in the tubes, and we shall have a measure of the rate at which our gas passes through the wet cork and the dry cork, by noticing the difference in the rise of the liquid in the two tubes. If it passes quicker through the dry cork than the wet one, we shall find that the liquid will rise more rapidly in that tube, and I think you will find that the difference will be very great indeed. They are now both standing in the colored liquid, and already there is a perceptible rise in the tube with the dry plug; but in the other one I cannot yet see the liquid at all. So it is in the simple case of a wine bottle. If the cork of a bottle is wetted, so as to allow an exceedingly slow diffusion of air through the contents, the wine gets very slowly oxidized, and undergoes only that gradual transformation which is wanted; whereas, in the other case, it is turned sour and spoilt by too rapid oxidation.

I could gladly have entered upon many other facts and considerations which belong to this subject, but one must stop somewhere. I cannot, however, part from you without expressing my very strong sense of the debt which we owe to that great investigator whom I have already quoted so many times. I think there are few precedents of research so fruitful as those of M. Pasteur, if we consider, not only the theoretical importance, I mean with regard to our knowledge of the processes of life, and the origin of life, of his investigations regarding germs in the air, and these processes of fermentation; but if we take into account also the fact that he has succeeded in working out one of the most complete practical applications of it in a process like wine making and keeping,—we cannot refrain from admiring the truly perfect adaptation of the highest science to a useful purpose. I will now proceed to open these two sets of bottles, some of which have been heated and some not, and I hope the result will be satisfactory.

The samples of wine were then tasted by the audience, the difference being most remarkable, not only in taste, but also in color and general appearance.

At the conclusion of the lecture, Mr. Foster, the secretary, proposed a vote of thanks to Professor Williamson, which was carried with acclamation, and suitably acknowledged.

*Concluded.*

## ON SYRUPUS ASSAFŒTIDÆ.

BY JOHN M. MAISCH.

Some years ago Mr. Rich. Peltz proposed a syrup of Assafœtida containing 15 grains of the gum resin in each fluid ounce, and which was intended as a permanent substitute for the officinal mistura assafœtidæ, which in the course of a few days usually spoils. During the prevalence of whooping cough, a few years ago, when assafœtida was often prescribed, I prepared a syrup, which was used by several physicians to their entire satisfaction, and which has kept well up to the present time. Instead of the boiling water used by Mr. Peltz, I have employed water at the ordinary temperature, and added some orange flower water, which covers to some extent the odor of assafœtida, without masking it altogether.

Two drachms of selected tears of assafœtida are triturated with a sufficient quantity of water until three fluid ounces of emulsion have been obtained, to which half a fluid ounce of triple orange flower water is added, and afterwards six troy ounces of sugar, which is to be dissolved by agitation without the aid of heat. It is important to perfectly emulsionize the assafœtida with the small amount of water, which, though more difficult than the preparation of lac assafœtidæ, is readily accomplished by judicious trituration with small portions of the water, and the removal of the concentrated emulsion, when trituration is continued with another portion.

The syrup thus prepared is whitish opaque and separates, on long standing, a portion of the resin like cream, which on occasional exposure to the air acquires a pinkish hue, and subsequently a deep pink color; it can be readily mixed with the syrup by agitation. The change in the color of the resin, of course, alters the appearance of the syrup in course of time, it becoming of a pinkish color after the separated resin has again been diffused in it. An officinal preparation similar to the one described, it appears to me, would be by far preferable to the milk, since it is permanent and affords an opportunity of combining assafœtida with other liquid medicines without much trouble.—*Amer. Jour. Pharmacy.*

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## ON THE QUANTITATIVE ANALYSIS OF WHITE LEAD GROUND IN LINSEED OIL.

BY VICTOR BIART.

Text books on chemistry tell us very little about adulterations of paints. Take, for instance, white lead; how shall we proceed? If the druggist bought it in the state of powder, it would be relatively easy; but as it is generally sold ground in linseed oil, the case appears to be more complicated. If we refer to books, it will generally be with disappointment.

As an instance, I give what I found in a good book on chemistry, in the part of the work relating to chemical analysis, speaking of the analysis of white lead in oil, the author says: "When the white lead is mixed with oil, it becomes more difficult to ascertain the exact nature of the adulterations, since the methods which must be adopted in order to destroy the oil (viz: incineration; or boiling with hydrochloric acid, and gradually adding chlorate of potassa), will alter to a greater or less extent the forms of combination in which the substances exist, and the analyst must content himself with merely identifying the different acids and bases; the quantities of these will, however, guide him in his conclusions as to the really important adulterations. Probably by powerful pressure in blotting paper, between hot iron plates, the oil might be so far extracted as to allow of the application of the ordinary methods of testing."

But such a process would be altogether too tedious, and I would suggest the following plan: If you have a sample of white lead ground in oil, and you wish to test it, it is not necessary to make a thoroughly accurate chemical analysis of it; all you want is the detection of one or more probable impurities, and these are generally sulphate of baryta, sulphate of lead, sulphate of lime (plaster Paris), and carbonate of lime (chalk). The sulphate of baryta is almost universally employed in adulterating white lead; in fact, that is what it seems to be created for, and the manufacturer of white lead readily takes the advantage of the whiteness, the firmness, the weight, and, above all, the cheapness of sulphate of baryta; all it lacks is the opacity, commonly termed the body, for it does not cover well.

The way to proceed, then, is as follows: Take a small precipitating bottle, weigh it, and introduce in it a certain quantity of the white lead ground in oil. Then add about four times the quantity of ether, shake frequently till all oil is dissolved, decant and add another small quantity of ether, shake again, decant and repeat the operation till a few drops of the ether used will not stain a sheet of white paper on evaporating. Collect all the ether used, evaporate, and the oil is left as residue; weigh it and calculate the percentage of oil in the white lead. Now warm the bottle with the dry white lead in it, so as to eliminate all the ether, then weigh it, and the difference of weight before and after digestion with ether must be equivalent to the amount of oil extracted.

To the powder obtained, add a little nitric acid diluted with three times its volume of pure water. White lead being a basic carbonate of lead, its carbonic acid will be expelled, and nitrate of lead will be the compound in solution.

If no sediment remains, then only test for lime as follows: Add ammonia in excess, which precipitates the oxide of lead, then decant and add a solution of carbonate of potassa, which precipitates the lime if present. This is dried and weighed, and the amount of carbonate of lime it represents is calculated as follows:

28: 50:: weight of precipitate: x
x=weight of chalk.

Or the solution may be treated with oxalate of ammonia, which precipitates the lime as oxalate of lime; this may be converted into a carbonate by ignition, and then weighed.

If, on the addition of diluted nitric acid, an insoluble residue is left, then this residue must be tested for the sulphates of baryta, of lead, or of lime. Boil the residue with dilute hydrochloric acid; the sulphates of lead and of lime will be dissolved and the baryta left; this may then be dried and weighed. Precipitate the lead by adding ammonia and sulphide of ammonium, the sulphide of lead formed is treated with concentrated nitric acid, which converts it entirely into sulphate, and as such it may be weighed and directly determined. Lastly, the lime may be precipitated by oxalate of ammonia, ignited and converted into carbonate of lime, this is dried and weighed, and the amount of sulphate of lime it represents is calculated as follows:

50: 68:: weight of ignited oxalate of lime: x
x=weight of sulphate of lime.

—*Leavenworth Journal of Pharmacy.*

## SYRUP OF SANTONATE OF SODA.

BY J. DONDE.

A good vermifuge syrup is prepared by the following formula:

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|---|---|
| Santonate of soda | 30 grains. |
| Distilled water | 1 ounce. |
| Syrup | 18 fluid ounces. |

Boil the syrup till it is concentrated to 32° Bme. Remove from the fire, let it cool a few minutes, then add the salt dissolved in the water.

You obtain 18 fluid ounces of a transparent syrup, without a bitter taste, of 35° when cold. Each fluid ounce contains one grain of santonine. I have been preparing this syrup for nine years, in the drug store of Mr. Font.

### SANTONATE OF SODA.

| | |
|---|---|
| Santoninic acid, in fine powder | 2 ounces. |
| Caustic soda lye, pure | 4 fluid ounces. |
| Distilled water | 12 fluid ounces. |

Put all in a flask, and heat in a sand-bath or over a stove, to 70° or 80°, until the solution of the santonine is complete, which usually requires about half an hour; then remove from the fire, and when cold it is conveniently evaporated. In cooling, prismatic crystals with an oblique base are obtained, containing 54 per ct. of santonine.

When the solution is evaporated until a strong pellicle is formed, on cooling it is converted into a mass of acicular crystals of a pearly aspect, which contains 60 per cent. of santonine.

The santonate of soda is soluble in 1¾ its weight of water (20°C.) and has a slightly bitter taste.

MERIDA, Aug. 14, 1871. —*Amer. Jour. of Pharmacy.*

## PRACTICAL RECEIPTS.*

*Abernethy's Pills.*—Take of mercurial pill mass 36 grains, compound extract of colcynth 24 grains. Make into twelve pills.

*Amandine, Transparent.*—Take of fine white honey 4 ounces, fine white soap 2 ounces. Mix these well in a mortar, adding one ounce liquor potassa, until the mixture becomes a perfect cream; rub in with caution and slowly 7 pounds of almond oil (sweet), and 1 oz. of essential oil of bitter almonds, adding to taste a sufficiency of oils of bergamot and cloves, and lastly, half a drachm of balsam of Peru.

*Bloom of Almonds.*—Boil 1 ounce of ground Brazil wood in 50 ounces of water for half an hour, add the juice of two lemons; strain and add 6 drachms of isinglass, 2 drachms of powdered cochineal, 1 ounce of alum, and ½ ounce of borax; boil for five minutes and strain through muslin. Use only glass vessels.

*Candy, Digestive.*—Take of rhubarb and carbonate of soda ea. 1 drachm, ginger ½ drachm, cinnamon 20 grains, heavy magnesia 1 ounce, sugar 2 ounces; all of the above must be reduced to fine powder; mucilage of gum tragacanth a sufficiency to form a mass; to be divided into cakes of 20 grains each.

*Chilblain Cream.*—Dr. Pardon. Balsam of Tolu ½ drachm, rectified spirit 1½ ounces; dissolve, add hydrochloric acid ½ drachm, compound tincture of benzoin ½ drachm. To be applied on a piece of linen.

*Cigarettes, Balsamic* (for asthma, &c.)—Soak strong unsized paper in a solution of saltpetre; this dry, and treat first with tincture of cascarilla, and afterwards, when nearly dry, with compound tincture of benzoin; cut into squares of a suitable size, and roll into the form of cigarettes.

*Colors for Show Bottles.—Amber.*—Dragon's blood in coarse powder 1 part, oil of vitriol 4 parts; when thoroughly dissolved, dilute with cold distilled water till the required tint is obtained. *Lilac.*—Dissolve oxide of cobalt in hydrochloric acid, adding sesquicarbonate of ammonia in excess, and afterwards sufficient ammonio-sulphate of copper to bring the desired color. *Orange.*—Dissolve bichromate of potash in water and add a little sulphuric acid. *Violet.*—Mix together solutions of nitrate of cobalt and sesquicarbonate of ammonia, adding a sufficiency of ammonio-sulphate of copper to strike the required color. *Blue.*—Take of solution of perchloride of iron 10 drops, yellow prussiate of potash 10 grains, oxalic acid 2 drachms, water 1 gallon. *Red.*—Solution of perchloride of iron 10 drops, sulphocyanide of potassium 10 grains, water 1 gallon. *Crimson.*—Iodine and iodide of potass. of each 30 grains, hydrochloric acid 1 drachm, water 1 gallon. *Green.*—Sulphate of copper 1 drachm, bichromate of potash 30 grains, strong liquor of ammonia 2 ounces, water 1 gallon.

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* From The Chemists' and Druggists' Compendium. By John Owens. London, Eng.

*French Polish* (Ure).—Take of shellac 12 ounces, gum elemi 2 ounces, gum copal 3 ounces, spirit of wine 1 gallon; dissolve.

*Furniture Oil.*—Boiled linseed oil 1 pint, yellow wax 4 ounces; melt together and color with alkanet root.

*Incrustation Compound.*—Under the name of Hallogenin the following composition is largely used in Germany for preventing the incrustation of steam boilers: 65 parts of hydrochlorate of ammonia, 17 parts of chloride of barium, and 18 parts of catechu.

*Ink, Blue-Black Copying.*—Aleppo galls, bruised, 5½ ounces, cloves, bruised, 2 drachms, sulphate of iron 1½ ounce, sulphate of indigo 1½ ounce, sulphuric acid 35 drops, rain water cold 40 ounces; macerate the galls and cloves in 20 ounces of the water for eight days, decant and add to the solid residue 20 ounces of water, macerating for four days; decant. Mix the whole of the liquor, and finally add in the order named the sulphate of iron, the sulphuric acid and the indigo.

*Kalydor.*—This very celebrated cosmetic is made somewhat as follows: Take of bitter almonds blanched 1 ounce, corrosive sublimate 8 grains, rose water 16 ounces. Mix.

*Lavender Water.*—(Dr. Pareira.) Oil of lavender (flowers) 3 drachms, oil of bergamot 3 drachms, oil of roses (otto) 6 drops, oil of cloves 6 drops, musk 2 grains, oil of rosemary (best) 1 drachm, honey 1 ounce, benzoic acid 40 grains, rectified spirit 20 ounces, water 3 ounces (a very superior preparation).

*Liquid Glue.*—(Doumoulin's.) Dissolve 1 pound of best glue in 20 ounces of water, add gradually 3½ ounces of nitric acid; after the mixture has ceased to effervesce set aside to cool.

*Tincture of Iodine, colorless.*—Take of compound tincture of iodine 45 grains, carbolic acid crystallized 6 grains, glycerin 8 drachms, water 5 ounces.

*Vinegar, Aromatic.*—Take of camphor 1 ounce, oil of cloves 1 drachm, oil of lavender 40 drops, oil of rosemary 40 drops, acetic acid (glacial) 10 ounces.

## LIGHTNING RODS.

We herewith publish full directions for the mounting of lightning rods, prepared by the chief electrician of the country, Professor Joseph Henry, of the Smithsonian Institute, Washington. They will be found useful to everybody, and ought to allay the fears of persons who are easily frightened by thunder and lightning:

1st. The rod should consist of round iron, of not less than three-fourths of an inch in diameter. A larger size is preferable to a smaller one. (Ordinary gas pipe may be employed.) Iron is preferred, because it can be readily procured, is cheap, a sufficiently good conductor, and, when of the size mentioned, cannot be melted by a discharge from the clouds. Other forms of rod, such as flat or twisted, will conduct the lightning, and in most cases answer sufficiently well. They tend, however, to give off lateral sparks from the sharp edges at the moment of the passage of the electricity through them, which might, in some cases, set fire to very combustible materials.

2d. It should be, through its whole length, in perfect metallic continuity; as many pieces should be joined together by welding as practicable, and, when other joinings are unavoidable, they should be made by screwing the parts firmly together by a coupling ferule, care being taken to make the upper connection of the latter with the rod water-tight by cement, solder or paint.

3d. To secure it from rust, the rod should be covered with a coating of black paint.

4th. It should be terminated above with a single point, the cone of which should not be too acute, and to preserve it from the weather, as well as to prevent its being melted, should be encased with platinum, formed by soldering a plate of this metal, not less than a twentieth of an inch in thickness, into the form of a hollow cone. Points of this kind can be purchased of almost any mathematical instrument maker. Usually the cone of platinum, for convenience, is first attached to a brass socket, which is secured on the top of the rod, and to this plan there is no objection. The platinum casing, however, is frequently made so thin, and the cone so slender, in order to save metal, that the point is melted by a powerful discharge.

5th. The shorter and more direct the rod is in its course to the earth the better. Acute angles, made by bending the rod, and projecting points along its course, should be avoided.

6th. It should be fastened to the house by iron eyes, and may be insulated by cylinders of glass. We do not think the latter, however, of much importance, since they soon become wet by water, and, in case of a heavy discharge, are burst asunder.

7th. The rod should be connected with the earth in the most perfect manner possible; and in cities nothing is better for this purpose than to unite it in good metallic contact with the gas mains or large water pipes in the streets; and, indeed, such a connection is absolutely necessary, if gas or water pipes are within the house. Electricity, by what is called induction, acts at a distance on the perpendicular gas pipes within a house, rendering them so highly negative, the cloud being positive, as to attract the electricity from a lightning rod imperfectly connected with the earth, or even from the air through the roof. Damage to buildings on this account is of constant occurrence. The above connection can be made by soldering to the end of the rod a strip of copper, which, after being wrapped several times around the pipe, is permanently attached to it. Where a connection with the ground cannot be formed in the way mentioned, the rod should terminate, if possible, in a well, always containing water; and, where this arrangement is not practicable, it should terminate in a plate of iron or some other metal buried in the moist ground. It should, before it descends to the earth, be bent, so as to pass off at nearly right angles to the side of the house, and be buried in a trench, surrounded with powdered charcoal.

8th. The rod should be placed, in preference, on the west side of the house, in this latitude, and especially on the chimney from which a current of heated air ascends during the summer season.

9th. In case of a small house, a single rod may suffice, provided its point be sufficiently high above the roof; the rule being observed, that its elevation should be at least half of the distance to which its protection is expected to extend. It is safer, however, particularly in modern houses, in which a large amount of iron enters into the construction, to make the distance between two rods less than this rule would indicate, rather than more. Indeed, we see no objection to an indefinite multiplication of rods to a house, provided they are all properly connected with the ground and with each other. A building entirely inclosed, as it were, in a case of iron rods so connected with the earth, would be safe from the direct action of the lightning.

10th. When a house is covered by a metallic roof, the latter should be united, in good metallic connection, with the lightning rods; and in this case the perpendicular pipes conveying the water from the gutters at the eaves may be made to act the part of rods, by soldering strips of copper to the metal roof and pipes above, and connecting them with the earth by plates of metal united by similar strips of copper to their lower ends; or, better, with the gas or water pipes of the city. In this case, however, the chimneys would be unprotected, and copper lightning rods, soldered to the roof and rising a few feet above the chimneys would suffice to receive the discharge. We say soldered to the roof, because, if the contact was not very perfect, a greater intensity of action would take place at this point, and the metal might be burnt through by the discharge, particularly if it were thin.

11th. As a general rule, large masses of metal within the building, particularly those which have perpendicular elevation, ought to be connected with the rod. The main portion of the great building erected for the World's Exhibition at Paris was entirely surrounded by a rod of iron, from which rose at intervals a series of lightning conductors, the whole system being connected with the earth by means of four wells, one at each corner of the edifice.

The foregoing rules may serve as general guides for the erection of lightning rods on ordinary buildings, but for the protection of a large complex structure, consisting of several parts, a special survey should be made, and the best form of protection devised which the peculiar circumstances of the case will admit.—*Journal of Applied Chemistry*.

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# THE PREPARATION OF LIQUOR BISMUTHI.

BY C. H. WOOD, F.C.S.

For the last two years I have frequently resorted to a process for the preparation of a liquor bismuthi, which would, I think, constitute a good process for a future Pharmacopœia, because, while it is very simple and is easily performed, it yields a product quite free from nitrate of ammonia, and eliminates all the impurities of metallic bismuth.

To proceed by this method, I first obtain pure anhydrous oxide of bismuth. A weighed quantity of this oxide is then digested with a mixture of citrate of ammonia and citric acid in strong solution for fifteen or twenty minutes at near the boiling temperature, after which a slight excess of ammonia is added, and the solution diluted to the required volume. The mixture of citrate of ammonia and citric acid rapidly converts the anhydrous oxide into citrate of bismuth, which the ammonia afterwards added instantly dissolves.

The oxide of bismuth is best prepared from the subnitrate of commerce. A pound of the subnitrate is boiled for five minutes with four pints of liq. potassa, then washed by decantation and dried in a stove or water bath. It forms a dull lemon-yellow powder, which is anhydrous and perfectly definite in composition, being represented by the formula $Bi_2O_3$. 100 parts of the subnitrate yield from 81 to 82 of oxide.

Instead of boiling the basic nitrate with the potash, digestion in an earthenware jar may be resorted to. Care should be taken to employ liq. potassæ free from carbonate. As the oxide subsides with great rapidity, it is perfectly washed with ease and quickness by decantation. I have always found commercial subnitrate of bismuth to be quite free from copper, and any traces of arsenic or antimony which it might contain would be completely removed by the potash; consequently the oxide of bismuth must be of great purity.

The following formula is adapted to the preparation of a gallon of liquor bismuthi, having the same strength as the solution of the Pharmacopœia:

| | |
|---|---|
| Oxide of bismuth . . . | 9 oz. |
| Citric acid . . . . . . | 16 oz. |
| Strong solution of ammonia . | 12 fl. oz. or q. s. |
| Water . . . . . . . | q. s. |

Dissolve 8 oz. of the citric acid in 4 oz. of hot water, and carefully neutralize it with some of the solution of ammonia (about 7 fl. oz.), mixed with half its volume of water. Then add the other 8 oz. of citric acid, and when it has dissolved introduce the oxide of bismuth. Heat the mixture to near its boiling point for about fifteen minutes, with frequent stirring, then add about a pint of water and introduce sufficient ammonia to dissolve the insoluble portion, and render the liquid slightly alkaline. Augment the solution to the volume of one gallon, and filter through paper.

It will be found upon heating the mixture that the pale yellow color of the oxide rapidly changes to a pure white, and at the same time the insoluble portion becomes more bulky. These signs indicate the conversion of the oxide into citrate of bismuth; the digestion is continued for a little time to insure the perfect completion of this change. The ammonia, subsequently added, should effect a complete solution, leaving nothing insoluble but the dust, etc., inevitably present in the powder taken.

As the oxide of bismuth employed is quite as definite a substance as the metal itself, it follows that the resulting liquor will be as uniform in strength as if prepared according to the process of the Pharmacopœia.—*Pharm. Journal, London.*

## FLUID EXTRACT OF VANILLA.

| | | |
|---|---|---|
| *R* | Vanilla beans | lb. i. |
| | Sugar . . | lb. ij. |
| | Glycerine . | Oj. |
| | Water . . | Oij. |
| | Alcohol dil. | Oiij. |

Have the vanilla powdeaed in a coarse condition, with the aid of the sugar; heat three pints of water and one pint of glycerine to a boiling state, and having put the vanilla in a close vessel, add the boiling liquid to it. Allow it to macerate for three or four days, and add two quarts of dilute alcohol; again allow it to macerate for two weeks, then throw it on a large filter, using enough dilute alcohol to percolate six pints, and add to this result two pints of simple syrup.

This extract will represent two ounces to the pint, and can be diluted one-half, using one pint of alcohol and three pints of water, and makes an extract stronger than usually is retailed as essence of vanilla.

I have been more successful in making the extract by the above formula than I have been at any time, either with strong or dilute alcohol.

Respectfully, CARL FRUH.
PHILADELPHIA. *In Druggists' Circular.*

## BLEACHING SHELLAC.

The bleaching of shellac is generally effected on a large scale by chlorine or some of its compounds, or by sulphuric acid; the bleached article costs more than twice as much as the unbleached. The bleached shellac is frequently dissolved in spirits of wine for use as a varnish by cabinet makers. This varnish is apt to stain any inlaid metallic ornament upon the furniture, or any metal attached to it, in consequence of the varnish retaining a small proportion of the bleaching compound in solution, Another process of bleaching may be adopted which renders the varnish free from this objection, and very much reduces the cost of the bleached shellac or seed-lac. This process consists in the use of animal charcoal as a bleaching powder. It is prepared in the following manner: Any quantity of yellow shellac, previously broken in small pieces, is conveyed into a flask, alcohol of 0·83 sp. gr. poured upon it, and the whole heated on the hob, or, in the summer, in the sun, until the shellac is dissolved; upon this so much coarsely powdered animal charcoal is added to the solution that the whole forms a thin paste; the flask is closed, not quite air-tight, and left so for some time, exposed to the sun; and in eight to fourteen days a small sample is filtered, sufficient to ascertain whether it has acquired a light, yellowish-brown color, and whether it yields a clear, pure polish on light colored woods. If this be the case, it is filtered through coarse blotting paper, for which purpose it is best to employ a tin funnel with double sides, similar to those employed in filtering spirituous solutions of soaps, opodeldoc, etc. The portion which first passes through the filter may be preserved separately, and used as a ground or first polish. Then some more spirit is poured over the charcoal upon the filter, and the solution used as a last coating. The solution of shellac purified by animal charcoal has a brown-yellow color, but it is perfectly clear and transparent; when diluted with alcohol, the color is so slight that it may be used in this state for polishing perfectly white wood, such as maple, pine, etc., without the wood acquiring the least tint of yellow.—*Druggists' Circular.*

## THE PURIFICATION OF FATS AND SUETS.

The task that devolved upon the authorities of Paris during the late siege of that city by the Germans, of obtaining food for the many thousands who were cut off by the iron circle of their enemies from their usual sources of supply, was a difficult, and, as the event proved, an impossible one. Towards its accomplishment, however, great efforts were put forth by French *savans*, and for a time the whole current of scientific investigation was turned towards securing increased effectiveness in warlike weapons, the enforcement of the sanitary regulations best suited to the abnormal state of affairs, and the discovery and utilization of previously unknown or unused alimentary substances.

Among the many memoirs presented to the French Academy with the last-mentioned object, were some that treated of a subject not without interest to pharmacists,—the purification of fats and suets,—of which the following is a *resume.*

M. A. Boillot communicated a method which he stated had yielded excellent results, and for which he claimed the merits of simplicity and moderate cost. Two litres of lime-water is added to one kilometre of the fat or suet, mixed well together, and kept over the fire two or three hours. It is then left to cool, and, when it has become pasty and acquired a sufficient consistence, it is decanted, placed in flannel or linen, and submitted to an increasing pressure, when water and oleic acid, containing besides some solid fatty acids, from which it can readily be freed afterwards, passes through. The oily mass, after two or three days, acquires a whiteness which leaves nothing to be desired; and when freed from the little lime that it contains by treating it with water slightly acidulated with sulphuric acid, may be used for purposes of illumination. Fat thus prepared loses its bad odor, and acquires a remarkable hardness and whiteness; and if run into water to which a small quantity of sulphuric or acetic acid, or vinegar, has been added, it will be thoroughly purified, and may be employed for all purposes to which the best fats are applied.

M. Dubrunfaut states that the most tainted fat may be deprived of its characteristic odor by submitting it to the operation of frying; and that, after being thus treated in a manner specified, it may be used for all culinary preparations, and even for pastry. For this fact he furnishes the following scientific explanation.

M. Dubrunfaut has practically ascertained, by laboratory and manufacturing experiments, that fish oil is radically deprived of its odorous principle by simply heating it to a high temperature (330° C.) He has also found that the fatty acids are volatilized in a current of steam at a temperature above 100° C., whilst the neutral fats remain perfectly fixed. Finally, he has found that the neutral fats comport themselves in a similar manner to the fatty acids under the influence of a current of steam, if they have previously been heated to a temperature of from 300° to 330° C.

The manner in which the purification is effected is by heating the fat in a frying-pan or other suitable utensil to a temperature of about 140° to 150° C., then cautiously sprinkling upon it small quantities of water. the vapor so caused traverses the fat, decomposes the neutral fatty substances,—which, as shown by M. Chevreul in the case of hircine, yield fatty acids,—the whole of the fatty acids are volatilized, and the purification is accomplished. These conditions, he says, unite all the elements which are favorable to the elimination of the volatile fatty acids, which are generally the material cause of that odors of fat substances. The product thus obtained is as perfectly purified as the finest lard.

M. Dubrunfaut had so much faith in the efficacy of this method of purification, that he called attention to the large quantity of candle tallow still in the city, and stated that by a modification of the process to suit the known constituents of the tallow, the whole of it might be so purified as to fit it for use in cooking various kinds of coarse flours, such as buckwheat flour, and thus secured for the purposes of almentation. The same method might also, he stated, be applied to the large stock of colza oil.

In a second note presented to the Academy, M. Dubrunfaut again called attention to the facility with which the large stocks of tallow and colza oil might be utilized for food, while the mineral oils would suffice for the purpose of lighting. On this occasion he pointed out the similarity of the origin of the kitchen fats and the tallow of commerce, and said that the absence from the kitchen fats of the repulsive odor of the tallow was due to the method of preparation. In the operation of roasting meat especially the conditions necessary for the purification of the fat—the high temperature and the superheated vapor—were relized in perfection. And although they were present in a less degree in the operation of boiling, still there was a real purification. This opinion is supported by the fact that tainted fat, undergoing ebullition in a melting-pot in the presence of salt water, is purified in proportion as the boiling is prolonged.

As the result of various experiments in which colza oil was treated according to M. Dubrunfaut's method, he reported that the oil lost its characteristic taste and odor, preserving only a slight savour that was not repulsive, and would not prevent its use in culinary operations.

MM. Wurtz and Willm reported that they had found that when colza oil was submitted to a current of steam at a temperature of from 116° to 120° C., an odorous and acrid principle was carried off without sensibly saponifying the oil,—an inconvenience which followed the employment of steam too highly heated. Washing with a feeble warm solution of carbonate of soda takes away all traces of the fatty acids that may have been formed, or have pre-existed, in oil of bad quality; but the separation of the soap so formed presents some difficulties.

M. Fua suggested a modificrtion of M. Dubrunfaut's method, which consisted in melting the fats at so high a temperature that the residue of the cellular and vascular tissues were thoroughly exhausted. He also expressed an opinion that these methods for the purification of fats were preferable to the introduction of either acids, alkalies, or other substances, as these foreign bodies had always to removed afterwards.—*Pharmaceutical Journal, London.*

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## EDITORIAL.

### THE FIRE.

The great calamity of the 8th and 9th ultimo, which henceforth will constitute the *hegira* of Chicago, overtook us with so many other thousands. The whole machinery which kept 330,000 people moving, suddenly stopped, overwhelmed by a catastrophe unprecedented in history. Chicago, peerless in the rapidity with which she has mounted up the heights of prosperity, in the magnitude of her woe still leads the world. Never did the two sides of a picture stand so sharply contrasted as the past of yesterday and the present of to-day for this proud city. As contrasted with the other great fires of history, that of Chicago, in the gross value of property consumed and the area devastated, is beyond question the most overwhelming that ever overtook a city. All our readers are familiar with the outlines of Chicago's calamity. There are twenty-five hundred acres burnt over, and on what other twenty-five hundred acres of earth was there ever garnered a richer harvest? In what other locality has there ever grown such persistent energy, such daring enterprise, such bold activity, such far-reaching plans? Twenty thousand buildings have been destroyed, and a hundred thousand people have been turned into the streets and thrown out of employment. A list of leading business-houses destroyed in the conflagration filled four columns of the *Tribune*, small print. This list did not embrace 5,000 houses doing a partial wholesale business, and the long array of retail establishments.

All that the traveler recognises of Chicago is destroyed. Its familiar hotels and trade palaces, magnificent churches, and library rooms, and public halls, and art galleries, and colossal manufactories, and imperial depots, are all swept away. The ruins of Herculaneum and Pompeii could but inadequately represent this sudden overwhelming calamity.

The fire commenced on the corner of Dekoven and Jefferson Streets, on the West Side. The houses in that part of the city were wooden, and from the prolonged dry weather were converted into kindling wood. The strong wind from the south-west urged on the flames with the force and precision of a tornado in its path through a forest. The fire followed Jefferson Street, taking all the buildings on the east side of that street, while the houses on the opposite side were scarcely scorched. The flames crossed the South Branch near the scene of the fire of the previous night, Oct. 7th. All the large lumber yards and wooden factories on Canal Street gave body to the fire in the neighborhood of the river. Van Buren Street bridge was consumed, its ironwork melting down instantly before the intense heat. The long line of the Fort Wayne and Chicago R. R. freight depot was here ignited, and also a magnificent elevator. The gas-works on the east side of the South Branch immediately took fire with explosive violence, and straightway the fire became a veritable deluge, for oceans of blazing tar flew out far and near. It was but an instant, and the great Pacific Hotel burst into flames, from which the fire, urged and condensed by the fierce wind as is a flame before a blowpipe, reached out far into the devoted town.

Before the fierceness of this flame iron melted down like wax, limestone became quicklime; the Nicholson pavements were fairly gnawed into by the hungry element.

From this point it would be impossible for one witness, or a score of witnesses, to record the succession in which the imperial structures went down to their death. The streets were packed with dense crowds of struggling humanity, who could scarcely escape before the swirling maelstrom of fire filled the street. All the great stone and iron-fronted structures went down more swiftly than the wooden shells where the fire originated. The fiery torrent seemed to swallow up and bear along everything in its path. Streets were no barriers. All the fire-proof buildings shared the common fate. Block after block went down in rows, and so rapidly that little was saved.

The fire commenced at nine o'clock P. M.; at half-past one it crossed the South Branch and entered upon its terrible work. So rapid and resistless its march, that at three o'clock A. M. it was already ravaging the North Side and had disabled the water-works; and then no hope was left in any heart of saving the devoted town. The fire absolutely burned itself out, keeping on until there was no more material to supply its ravages.

By Monday evening the fire had essentially spent its fury. Thus in twenty-four short hours the whole of this terrible disaster was consummated.

The fearful lesson taught by this fire is, that nothing is secure in modern cities against such desolation. We are now satisfied that there is no city in Christendom which is not at the mercy of a spark.

Cannot human sagacity and science do something to avert this? Must all the treasure and life-work of a great population continue to be in this fearful danger?

Cannot Chicago, in its reconstruction, do much to render the repetition of such a calamity impossible in the future?

We were impressed greatly, in viewing the desolation on the North Side, to see the Ogden mansion—built entirely of wood—standing uninjured in the midst of the surrounding ruins, like an oasis in the terrible desert. It was surrounded by trees and signally protected by the open space of Washington Park, which was also filled with trees. If a great boulevard, five hundred feet in width, surrounded a city's treasures, such a catastrophe as that which has overtaken us would be impossible.

The great houses of our cities should be more isolated in every way. The Chicago fire demonstrates that of all building material brick is the best, beyond peradventure, for resisting fire. Iron melts, breaks and lets down all superincumbent structures.

Human ingenuity should be taxed to the uttermost to make our fire department more efficient. We must devise means to prevent the spread of flames. We pay vast sums to architects for designing fine buildings ; we should be as ready to pay for their protection. The very best engineering skill which money can secure should be at hand to confront every fire, and not simply the brawny arm and obstreperous voice. We have no word of complaint for our firemen—their endurance, and even heroism, is beyond praise ; but their labor should be well directed, or it is lost to us. The resources of science have in no measure been exhausted. Good vaults and safes have come through this trial triumphant, and we know that much more is possible.

We cannot dismiss this subject without a word concerning the great wave of sympathy which has set toward Chicago from every part of the world. Such a going forth of help, instant and mighty, was never before known in human history. While the hungry flames were still devouring our beautiful city, help came from every city from Maine to the Gulf. St. Louis and Cincinnati, our rival sisters, opened their hands widely for our relief. Swifter than bird ever sped to its nest came the relief which was never more greatly needed. Europe, even, was awake to our calamity ; and from London, Liverpool, and Frankfort-on-the-Maine, came immediate and tangible help.

Already, though the ashes are not yet cold, temporary accommodations for fifty thousand houseless people are erected, and no fear can now be entertained that security for the winter has not been attained.

We are among those who fully believe in the manifest destiny of Chicago. She will rise again stronger, fairer, better than ever before. Her railroads remain, and Lake Michigan, her tributary divinity. If a third of a century has witnessed the whole of her marvellous rise against almost insuperable difficulties, a half dozen years will completely reinstate her. The spirit of the people is unflagging in activity and enterprise—these are unconsumed and will surely repeat the triumphs of the past.

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## THE COLLEGE OF PHARMACY.

To us personally, one of the saddest things connected with the late fire, and peculiarly unfortunate as bearing on the interests of the science of Pharmacy in the West, is the total loss of property belonging to the Chicago College of Pharmacy. This loss includes, of course, all its valuable furniture and appliances, apparatus and library—the most complete in chemistry and pharmacy to be found in the West,—and a large and valuable cabinet, the labor of many years in selecting and accumulating. We are happy, however, to announce that, notwithstanding this severe loss, which involves the present suspension of the course of lectures, that the energy and devotion of the members of the College are equal to the emergency, and that they contemplate the reinauguration of the school by next season.

The course of lectures in this school (session of 71–2) commenced on Monday evening, October 2d. The course was inaugurated by an able introductory address by Mr. E. H. Sargent, President of the College. The announcement had been made that Prof. Hambright would deliver the opening address, but sickness and his absence in a distant city prevented the fulfillment of his obligation. Mr. Sargent was prevailed upon, by the urgent solicitation of the lecture committee, to supply the place of Prof. Hambright ; and though but short notice was given him, the class were entertained by a most excellent address, full of thought and of most valuable counsel touching the duties of students and the means of acquiring useful knowledge.

The regular lectures commenced on the succeeding Wednesday, and on Friday evening Prof. Hambright gave the last lecture ever given in the old rooms—endeared to the members of the College from the memories and associations of many years.

With the destruction of the College all the appliances and means of illustrating lectures were lost, and these cannot be instantly replaced. The Chicago Medical College, with characteristic generosity, tendered the use of their lecture-rooms and chemical apparatus for the continuance of the contemplated course. In view of the fact that but a small portion of the class (originally numbering some forty or fifty) could be brought together, the absence of the proper means of illustrating a good course in pharmacy and materia medica, and, lastly, the continued and more serious illness of Prof. Hambright, forced the members of the faculty to abandon the course of the present season.

There is no doubt that full arrangements will be made for the renewal of the College course next year, under prosperous auspices.

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## THE DRUG TRADE OF CHICAGO AND THE FIRE.

### APOTHECARIES.

No department of our mercantile interests suffered more generally, or in proportion to the capital invested, more severely in the great fire than did the Drug Trade. Of the one hundred and sixty retailers of Drugs in the city, upwards of fifty, or more than one-third of the whole number lost their all the wide spread devastation. It would be difficult or impossible to give an accurate estimate of their losses, but it may be confidently asserted that the sum total would not fall short of $400,000; these figures allude to losses of the retail druggists only. Among the sufferers were all the larger establishments, whose location in the heart of the city, requiring large and varied stocks and expensive fixtures, secured to them a most extensive and valuable trade. Not only have our druggists lost their material possessions, but in many instances, the advantages of a good reputation, secured by long years of toil in certain localities, were also wrested from them by the sudden depopulation of whole districts, and the scattering of population. The successful druggist, however, has not secured that distinction without labor and hardship, and hard as it is to be thus cast adrift, he will be able to reach a safe anchorage, where many another mortal would sink to rise no more. A majority of the apothecaries will be able to so arrange affairs as to recommence business.

### DRUGGISTS WHO HAVE SUFFERED.

Below we give a list, nearly complete, of the druggists whose establishments were burned during the great fire. A few, whose names we have been unable to ascertain, probably eight or ten, are omitted:

### RETAIL.

Biroth Henry, 39 N. Clark street.
Blinn & Johnson, 369 N. Clark street.
Bliss & Sharp, 105 State street.
Bodney A. R., 194 N. Wells street.
Braun Thos., 349 S. Clark street.
Bronold H., 208 N. Clark street.
Brown W. S. 447 N. Clark street.
Brock Hanson H. C., 49 Chicago avenue.
Bryan F. A., 33 Dearborn street.
Buck & Raynor, (two stores) 93 Clark and 135 State street.
Christian J. F., 167 1-2 Dearborn street.
Class C. F., 276 Division street.
Dale & Heiland, 155 Clark street.
Dyche D. R. & Co., corner Dearborn and Randolph streets.
Erich Victor, 190 Clark street.
Fernow Ludwig, 393 N. Wells street.
Fiske Calvin J., 249 Clark street.
Foss L., 58 Chicago avenue.
Gale & Blacki, 202 Randolph street.
Gardner C. H., 28 N. Clark street.
Garrison & Murray, store and drug mills, 136 Clark street.
Grunewald & Hoffman, 370 Chicago avenue.
Harrington James J., 37 Rush street.
Heuerman H. W., 432 N. Clark street.
Hoffman A. B., 71 Chicago avenue.
Hooper J. H., (two stores) 33 Rush and 171 N. Clark streets.
Hottinger, Anton.
Huyck Bros., 166 State street.
Israel S. G., 152 Dearborn street.
Knoelcke A. C., 144 N. Clark street.

Leavenworth B. H. & Co., 282 Clark street.
Letourneaux T. J., 117 Madison street.
Moench & Reinhold, 103 N. Clark street.
Muller W. H., 130 Fifth avenue.
O'Rién C. D. B., 248 Wells street.
Parsons John, 41 Clark street.
Reuter H., 67 W. Van Buren street.
Rohde A. & Co., 107 Chicago avenue.
Sargent E. H., 62 State street, and laboratory.
Schloetzer E. T., 124 N. Clark street.
Schraeder Noble, 85 Kinzie street.
Sherman Henry, 280 Clark street.
Sobey J., 65 Kinzie street.
Stahl E. S., 173 E. Van Buren street.
Vanderburg A. C., 238 N. Clark street.
Walker & Mann, 82 Madison street.
White & Schoen, cor. Madison and Franklin streets.
Whitfield T. & Co., 281 State street.
Weinberger C. M. & Co., 95 N. Wells street.

### WHOLESALE.

E. Burnham & Son, 19 Market street.
Hurlbut & Edsall, 32 Lake street.
Lord, Smith & Co., 86 Wabash avenue.
Rockwood & Blocki, 192 Lake street.
Tollman, King & Co., 35 S. Water street.
Van Schaack, Stevenson & Reid, 90 Lake street.

### DRUGGISTS' SUNDRIES.

Jones & Torrey.

It will be seen that upwards of *fifty retail* druggists were burned out; such was the rapidity of the distruction that scarcely anything was saved, but few being fortunate enough to rescue even their books and prescription files. Those who were located on the north side, lost their dwellings and personal effects also. When we add that insurance will give an average return of perhaps 15 per cent., our readers can imagine the extent of the losses sustained.

### PRESENT LOCATIONS.

With the energy characteristic of Chicago, several of the druggists whose stores had been destroyed, were located in new quarters before the expiration of the week, while others had equally early made arrangements for resuming business as soon as buildings could be procured.

The only business block in the region desolated by the fire, which stands to-day unscathed is that known as Lind's Block, on the west side of Market street, between Randolph and Lake; the buildings on the opposite side of the street suffered the common fate, but Lind's Block, favored by the unusual width of the street, and the direction of the wind, escaped. Occupying Nos. 20, 22 and 24 of this block, our fortunate friends, Messrs. Fuller & Fuller, wholesale druggists, were left intact, excepting a severe scorching, and the loss of the numerous signs which formerly decorated their establishment.

The following apothecaries have resumed business:

Henry Biroth, Thos. Braun, Henry Bronold, Buck & Raynor, C. T. Class, Dale & Heiland, Gale & Blocki, C. H. Gardner, H. W. Heuermann, J. H. Hooper, Anton Hottinger, Huyck Bros., S. J. Israel, A. C. Knoeltcke. J. T. Letourneaux, W. H. Muller, Henry Muller, John Parsons, E. H. Sargent, E. T. Schloetzer, A. C. Vanderburg, Thos. Whitfield.

### THE WHOLESALE TRADE.

For many of the following facts and figures we are indebted to the Chicago *Times*.

The extensive character of the drug trade of Chicago, is universally known; it has fully kept pace with the general growth of business in the city, the gross sales of the leading wholesale druggists amounting in the aggregate to $5,000,000 annually. With remarkable energy, all of the drug houses, save one, secured new locations and were prepared as usual for business within a few weeks following their total destruction.

*Hurlbut & Edsall.* This firm is well known throughout the country, Mr. Hurlbut having represented the drug business in the present firm and its immediate predecessor, J. H. Reed & Co., for a period of 28 years. Their annual business before the fire amounted to $800,000; stock carried, about $180,000; was insured for $123,000, of which probably $70,000 will prove good. They are located at present at 619 State street. but will remove to a large brick store at the head of River street, early next Spring. The firm is prepared to do as heavy a business as formerly.

*E. Burnham & Son*, are temporarily located at Nos. 157 and 159 Canal street; they expect before long to regain their former business, amounting to $500,000 a year. On their stock of $100,000 they hope to realize $40,000 from insurance.

*Van Schaack, Stevenson & Reid*, have located in the old Baptist Church, corner of 18th and Wabash avenue. Their business has been very large and constantly increasing, requiring a stock on hand valued at $170,000. They will realize 70 per cent. of their insurance. This firm will rebuild on their old site, corner Randolph and Lake streets. They have a complete stock and facilities for transacting their immense trade with their usual dispatch.

*Lord, Smith & Co.*, are in temporary wooden quarters on Washington street, but will rebuild on their old site, 86 Wabash avenue, without delay. Their business has averaged for several years $700,000. They will be able to collect about 40 per cent. of their insurance. The firm is fully prepared to honor the calls of all their old and many new customers.

*Tollman, King & Co.*, have resumed business at 53 West Lake street, with ample facilities for trade. Their loss on stock was $120,000, one-half of which they may recover from their policies.

Fuller & Fuller, as before stated, were among the fortunate, as their stock was uninjured; their immense business, amounting to about $1,250,000 annually, suffered no serious interruption, though their stock for a brief time was well nigh exhausted by the unprecedented demand which followed the fire.

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## THE VALUE OF A DEGREE.

In our October issue, we briefly made allusion to the action of the American Pharmaceutical Association in refusing to admit to its deliberations, the delegation from the department of Pharmacy of the University of Michigan. The ground of this rejection, as given by the committee to which the subject was referred, was that the school in question is not within the proper meaning of the Constitution of this Association, a College of Pharmacy *as it is not an organization of learning, which by its rules and regulations, insures to its graduates the proper practical training*, necessary to place them on a par with those of the several Colleges represented in this assembly." This action of the Association, as was to be expected, is made the subject of extended criticism in the Michigan University *Journal*, (October 1871).

The critic after meting out a due portion of advice to the Association, proceeds (to his own satisfaction), to the annihilation of the Colleges of Pharmacy by indicating the facilities for instruction afforded by the University course, in contrast with those given by the Colleges of Pharmacy, and by a comparison of the requirements for graduation in the respective institutions.

Then follows a recapitulation, which for the edification of our readers, and in justice to the critic, we quote:

"We have been and remain conscious of deficiencies in our pharmacy school. and we feel like asking patience with our beginnings, and honoring every effort to educate pharmacists. But we have not toiled from New Year to Christmas that our graduates should be placed "on a *par* with those of the several colleges, &c." It was not to this end that we have obtained the enlargement of laboratories, (while they had none); matured a new system of laboratory work, (while they gave none); increased our lectures on pharmacy proper from 60 to 100, (while they give less than 50); and worked with willing classes at the blackboard during the mornings from October to July, (while the daily business of their professors is not interrupted). Were it our design to classify our school with the colleges represented in the association, we should close our laboratories to pharmacy students, give them less than half the lectures they now receive, delivering them on alternate evenings from October to the first of March, get them places in a drug store if we could, fold our hands, require a certificate of four years service in any drug store, examine them on our lectures and graduate them. Then the Michigan University school of Pharmacy would have earned the honor of representation in the National Association of Pharmacists."

In this connection we may be allowed a word of comment, and to begin at the beginning, let us examine the first alleged cause of complaint by the Michigan delegation, this "disqualification" is embraced in the sentence, (we copy) "it (the university) is not an organization controlled by pharmacists." The official report of the committee contains no such clause, and assigns no such reason for the exclusion of the delegation. Neither would it be in conflict with the spirit or letter of the constitution of the association to allow the representation of any school of pharmacy, by whomsoever conducted, on this simple score of exclusiveness. No, the association is actuated by a more liberal spirit, and can recognize its indebtedness to the valued efforts of many not allied to them as pharmacists. On this point, therefore, the critic expends his rhetoric to no purpose.

In the second specification of the University *Journal*, we have a comparison of the required curriculum of the University course with that of the Colleges of Pharmacy.

We are free to admit the shortcomings of American Colleges of Pharmacy, acknowledging without hesitation the general absence of facilities for laboratory instruction, and we intend in a future article, to allude to these failings with more particularity, giving our influence as we have ever done, toward the improvement of the status of pharmacutical education.

There is, however, a redeeming feature of the humblest college of pharmacy, viz: the requirement of four years service in the shop of an apothecary, in addition to the college instruction, before a diploma is granted. Under this regime we have the strongest presumptive, as well as abundant actual evidence, that a graduate in pharmacy is qualified for the responsible trust he is to assume. We may feel assured that he is familiar with the various manipulations of the art, has a *practical* acquaintance with drugs, both crude and prepared, that he can recognize all ordinary chemicals at sight, is well informed on theoretical chemistry, pharmacy, materia medica and botany, and has had an extensive experience in dispensing medicines and in the actual routine of shop work. In short, he is worthy of the title granted by his diploma—a graduate in pharmacy—and does honor in most cases to his Alma Mater.

Far be it from us to detract from the many excellencies which go to make up the course of instruction in the department of pharmacy of the University of Michigan. Its system of laboratory instruction is admirable, its lectures comprehensive, its professors are men whose eminent qualifications none would dispute.

Such a course must give a student a good insight into the mysteries of chemistry, pharmacy, &c., but we shall show, and by admission of the University *Journal*, that all these facilities can not supersede the *necessity of actual shop training for the thorough instruction of the pharmaceutal student;* the actual experience of the shop is still required to make even a graduate of the department of pharmacy of the University of Michigan, an accomplished pharmacist. Says our cotemporary, "*the entire apprenticeship may be*, (and if now possible, a part at least is advised to be), *taken after the college course*," (italics our own). "Each year of this enlightened apprenticeship has its due value, and will find its level of worth in the labor market." "A youth of eighteen enters the school of pharmacy, graduates therefrom at twenty, and enters his vocation *at the foot of his ladder*, as all college graduates must do in any profession,") etc.

This brings us to a consideration of the value of a degree. What is indicated by the title "Pharmaceutical chemist?" We would naturally reply that it shows the possessor to be a man who is skilled in chemistry as applied in the pharmaceutic art, one who is likewise familiar with pharmacy, materia medica and botany, and all the minutæ which go to constitute the *most thoroughly qualified* dispenser of medicines. Such should be the significance of the degree, such it legally is in England and most continental countries, and so has it been almost universally regarded. No one then deserves the honored title of "Pharmaceutical chemist" unless he be a thoroughly experienced and scientific pharmacist.

The University of Michigan, has however, thought proper to degrade this title by conferring it upon those whom it confessedly admits are not fully qualified as dispensing chemists; with an arrogance which is remarkable, it confers upon the incompetent, an unearned degree—the highest known in this department of learning—and then slurs and attempts to depreciate the value of colleges of pharmacy, which with much modesty, confer the degree of graduate in pharmacy.

We have no word of condemnation for the course of instruction of the university, for we believe it is excellent as far as it goes, and if the institution would reserve its diploma and degree of "Pharmaceutical chemist" until such time as their students may have had an adequate shop experience, we would be among the first to honor the school and respect its graduates.

While our remarks are directed more particularly to the Michigan school, they will apply with ten-fold force to certain irregular institutions which pretend to teach pharmacy, and which manufacture "Pharmaceutical chemists," "masters in pharmacy," &c., with an ease and expedition that is truly mrveloaus. We have now in mind the Bowdoin College, and the Medical Schools of Washington, D. C. We may well ask, what is the value of a degree? when diplomas in art, literature, science, &c., are hawked about as marketable merchandise, or are at the option of any who may devote a few months and a few dollars to the securing of a nominal distinction, which should be above all price, and allotted to only such as are entitled to it as a mark of high attainments.

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## THE COLLEGE OF PHARMACY.

### MEETING OF THE TRUSTEES.

The general burden of distress of which the members of the Chicago College sustained their part, made it impracticable to convene a meeting until many days after the fire. On November 23d, however, a trustees meeting was held at the residence of President Sargent, at which the general condition, and the present and prospective wants of the College were discussed at length. The report of the treasurer indicated the sum total remaining in his hands at $276, this amount including the library fund. To best indicate the losses of the College, it can be said that nothing was saved, library, apparatus, cabinet of chemical and botanical specimens, plates—everything a total loss. There was partial insurance on the College property, in the Equitable of Chicago, the secretary holding a policy of $3,000, upon which not more than 3 per cent. can be realized. A serious loss was also in all of the back volumes of the PHARMACIST, not even one full set remaining to the College. The plates of the journal were also lost, and a small amount of paper stock.

Feeling remarks in regard to the noble sympathy and aid extended from abroad, were freely indulged in by all present. Upon motion, the following resolutions were unanimously adopted and ordered published:

WHEREAS, The druggists of San Francisco have, in addition to liberal subscriptions to the general fund for the relief of the sufferers of Chicago, also contributed in a most generous spirit to a special fund for the relief of suffering members of this College, and such act being a notable exhibition of the brotherly consideration entertained for members of the same profession in a distant city, it is especially worthy of our recognition and gratitude, it is therefore,

*Resolved*, That the hearty thanks of this College be returned to the noble members of our profession in San Francisco, for their generous and timely aid in relieving the distress caused by the terrible fire of October 9, for which act of brotherly sympathy and benevolence we will ever hold their names in grateful remembrance.

*Resolved*, That the officers of this College be directed to return suitable acknowledgement for the relief extended, and to request a list of the names of the donors, for the cabinet of this College.

WHEREAS, It is known to us that the druggists of other cities have, in a praiseworthy and most liberal manner contributed a special fund for the relief of the Chicago druggists who were rendered homeless and destitute by the late disastrous fire, and by their timely aid have relieved the sufferings of many worthy persons, recognizing in this act a beautiful illustration of the noble virtue and charity conferred in a spirit of true Christian philanthropy, it is hereby

*Resolved*, That this College, in grateful appreciation of the sympathy and generous liberality of the druggists of sister cities and colleges for the relief of their distressed brethren, do hereby tender to each of their benefactors hearty thanks, with the hope that no similar calamity may ever assail them.

Messrs. Buck, Whitfield and Patterson, were appointed a committee to visit the resident members of the College, and to report at a future meeting the best action to be taken to re-establish the College in its usefulness.

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## CALIFORNIA PHARMACEUTICAL SOCIETY.

The third annual meeting of the California Pharmaceutical Society was held, October 11th, at their rooms, No. 226 Sutter Street, John Calvert, President, in the chair.

The list of nominations made at a previous meeting, for officers, was presented to the meeting.

Mr. Steele then nominated W. E. Mayhew to the position of Recording Secretary.

On motion, the nominations were closed.

Mr. Steele, of the executive committee, stated that he had written to fifteen different wholesale drug firms for statistics, in order to make a full report, and that they had failed to respond. He further stated that the roll of membership at present amounted to over 100 ; that no member had been dropped, but ten had resigned during the year. These vacancies were, however, filled by the addition of new members. He also reported that the subject of incorporation of the Society had received considerable attention. He then reported to some extent upon the state of trade, importations, etc.

On motion, the above was received as a report of the Executive Committee, but with the request that it be more fully written up, that it might be entered in the minutes in regular form for reference. The motion was carried.

Considerable discussion took place upon the purchase of Gmelin's chemistry, which is said to cost about $135.

On motion, the matter was referred to the Executive Committee, with a request that they communicate with proper persons in England with regard to the purchase.

Mr. Steele, Secretary, reported that Brother Perkins had departed to the more pleasant fields of Salt Lake and left the matter in his hands. He stated that the Society was in a flourishing condition, etc. He also reported as Corresponding Secretary, stating that he had corresponded with a great many of the societies East, and had received letters from different persons, thanking the Society for conferring upon them the position of honorary members in the Society. The treasurer reported that on October 9, 1870, there was on hand $157 17 ; that he had received during the year, from different sources, a sum which, when added to the above, amounted to $559 67. The expenditures amounted to $440 20, leaving a balance of $119 67 ; that there had been received from Mr. Mayhew $135 for the library fund, making a total on hand of $254 67.

The meeting then proceeded to the election of officers, which resulted as follows: For President, J. A. Bauer; Vice-Presidents, E. Painter and William Geary; Recording Secretary, W. E. Meagher; Corresponding Secretary, W. T. Wenzell; Treasurer, Wm. J. Bryan. Executive Committee: J. G. Steele, John Calvert, W. E. Mayhew, William Simpson and W. T. Wenzell.

A large amount of correspondence was read by the Secretary. which was, on motion, placed on the file.

A number of queries which had been put to different members at the previous annual meeting were answered, among which was one as to the manufacture of cod liver oil on this coast. It was stated that, notwithstanding the fact of the fisheries being in successful operation for the past six or seven years, no single attempt of organized effort had been made toward the development of this large source of commercial wealth.

On the query of cultivation of rhubarb in California, Mr. Calvert stated that he had given up the riddle, because he found that there was no rhubarb cultivated in California.

Mr. Wenzell next read an answer to his query on ergotina.

This was an elaborate statement of the different processes employed in extracting the alkaloids; and the conclusion of the writer seemed to be that, owing to the difficulty and expense attendant on its extraction, "Ergotina" would not receive much attention as a therapeutic agent.

QUERY No. 12, fluid extracts *vs.* tinctures, was answered by Mr. Calvert. This gentleman read details of experiments performed under different temperatures, and with different methods, such as percolation, repercolation, evaporation, &c. He favored an attempt to lessen the number of tinctures, and change the strength of fluid extracts from 16 oz. to 8 oz. troy in a pint. This, with the other paper, was received and passed into the hands of the executive committee to be printed with the bound volume of proceedings.

Mr. Searby stated that almost every organization and society had done, and were doing, all in their power in aid of the Chicago sufferers.

He also stated that perhaps there might be some of their own brethren in the profession poor and destitute. He proposed that the Society take some steps in the matter. The following resolution was passed:

*Resolved*, In view of the recent calamity which has befallen the city of Chicago, we hereby appoint a Committee to solicit subscriptions from the members of this society; the same to be forwarded to the Treasurer of the Chicago College of Pharmacy, for the immediate relief of any of their members who may have suffered by the recent fire in that city.

The Soliciting Committee are Messrs. Searby and Mayhew for the south of Market Street, and Messrs. Calvert and Steele for the north of Market street.

Many expressions of sympathy for their brethren, and particularly for the Chicago College of Pharmacy, were advanced by various gentlemen present, and warmly endorsed by the meeting.

## THE LOUISVILLE COLLEGE OF PHARMACY.

The recently organized College of Pharmacy, Louisville, Ky., comprising among its members the most accomplished apothecaries and chemists of the city, has given abundant evidence of its energy, by inaugurating a school of Pharmacy. By a recent private letter from Prof. Diehl we learn that the prospect for a good class is very flattering, as about 35 had already signified their intention of attending.

This is certainly encouraging, and our friends deserve every success in their laudable effort to raise the standard of pharmaceutical education, and the requirements of drug clerks.

The introductory lecture of the first session, 1871–72, was given by Prof. Jenkins, in the rooms of the college, No. 211 Third street, on Monday evening, Nov. 31st. The regular course will terminate during the first week in April.

The faculty includes the following well-known and accomplished gentlemen: Thos. E. Jenkins, M. D., Prof. Materia Medica; S. D. Kastenbine, M. D., Prof. Chemistry; C. Lewis Diehl, Prof. Theory and Practice of Pharmacy.

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COLLEGE OF PHARMACY, OF THE CITY OF NEW YORK.
NEW YORK, October 18, 1871.

MR. E. H. SARGENT—*President of the Chicago College of Pharmacy:* Whereas the Board of Trustees having learned of the destitution by fire of the Chicago College of Pharmacy, and the probable doubt of its lectures being resumed this season, whereby its students may be embarrassed in accomplishing their desire to finish the college course as they had expected.

*Resolved*, That students who haue purchased tickets to the Chicago Collego of Pharmacy, and can produce evidence of the fact are cordially invited to attend the course of lectures now in progress at this college without charge.

*Resolved*, That we tender the expression of our sympathy to the Chicago College of Pharmacy.

In transmitting the resolutions passed by the board allow me to add the assurance of my own sympathy in the hour of your misfortune.

Hoping you will be able to make this invitation known to the students of your college,

I remain very truly yours,
E. L. MILHAU, *Sec'y.*

Similar resolutions were adapted by the Philadelphia College of Pharmacy, and forwarded with many expressions of the warmest sympathy.

## AID FOR SUFFERING DRUGGISTS.

By reference to our report of the third annual meeting of the California Pharmaceutical Association, it will be seen that the flames which devastated Chicago had scarcely subsided when that society, in session assembled, gave expression to noble sympathy, and appointed a committee to solicit aid for druggists and their families who might be in actual want. The solicitors called upon druggists only, and though most of them had already contributed to the general relief fund, a most generous response was the result. We would gladly give the names of the many donors to the fund, but their name is legion. Our $800 was placed at the disposal of the College of Pharmacy, by the druggists of San Francisco. No pen can do justice to the unparalled generosity of all the cities of the world toward Chicago in her hour of need. The heartfelt thanks and prayers of the many thousands of otherwise homeless and starving people, can be the only recompense for the true brotherly love—the true spirit of christianity, which so suddenly rose and spread from sea to sea and beyond to distant lands.

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## OUR JOURNAL.

The *Pharmacist*, burnt out the second time in thirteen months, must again bespeak the indulgence of its patrons. Our chief loss is in back volumes. of the *Pharmacist*, our plates, and some small quantity of paper stock. It is impossible for us to supply back numbers, and parties who possess them, and do not contemplate binding volumes, can confer a great favor by forwarding their numbers to us. We fortunately saved a complete file of the journal from the commencement, and our subscription list and accounts.

The *Pharmacist* bespeaks at present no charity, for enough has been poured out with lavish hand upon the poor afflicted people of Chicago.

We would, however, request an early settlement of all arrearages for advertising or subscriptions on the part of our friends We hope every subscriber will also use his influence to extend our circulation by securing us new subscribers for the volume commencing in January next.

We have confidence that our contributors will not forget us, but will continue their favors, in an emergency which cripples so many of our resources.

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[We insert the following note as showing the present condition and needs of the College of Pharmacy:]

To the Editor of the Pharmacist: The interest you have always shown in our College leads me to lay before you a statement of the loss we have sustained, thinking that in the intercourse with the members of the profession at large you might be able to secure aid for us in replacing the College in its former position of usefulness. We would not do this but for the fact that nearly all the active members have, like the College, lost all they possessed. In this really lies our weakness, as otherwise we could easily build it up again. All our library, cabinet of specimens, herbarium, apparatus and instruments for instruction, book-cases, furniture, etc., with the entire stock of the *Pharmacist* and many articles of value collected by years of effort, are gone. The College of late was more prosperous than ever, and its influence was becoming a power for good in the elevation of western pharmacy. Under such circumstances we feel that others interested in the promotion of the progress of pharmacy may be induced to assist us in reviving the College, and would ask you to faithfully represent us to those who are interested in our endeavors.

We do not lack willing hands nor strong hearts to do the work set before us, and, with the assistance and sympathy of our friends, we trust the future of our beloved College may be far better than its past.

Very respectfully,
Your obedient servant,
ALBERT E. EBERT,
*Corresponding Secretary Chicago College of Pharmacy,*
Cor. State and Twelfth Streets.